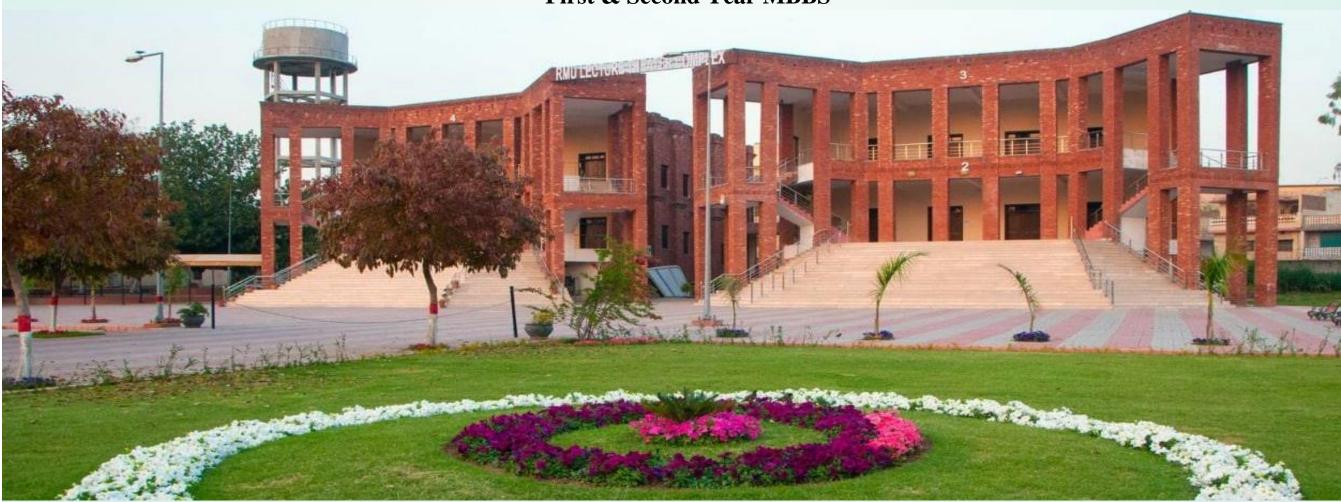
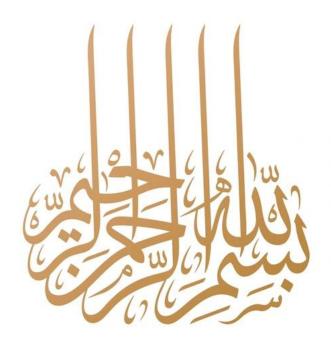


# Rawalpindi Medical University Clinically Oriented Integrated Modular Curriculum 2024 First & Second Year MBBS





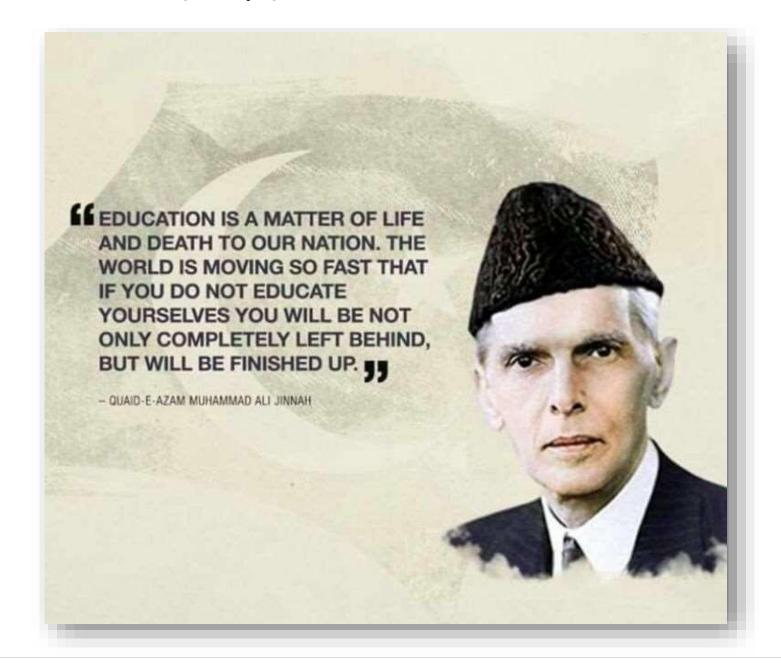
**Dedicated to Hazrat Muhammad (S.A.W)** 



# **Modular Integrated Curriculum 2024**

Revised September 2024

# **Quote by Quaid-e-Azam Muhammad Ali Jinnah**





## Sardar Saleem Haider Khan

Governor Punjab

It is with great pleasure that I extend my congratulations to Rawalpindi Medical University on the introduction of its Integrated Curriculum. This progressive step reflects the university's commitment to shaping the future of medical education in Pakistan, ensuring that our future healthcare professionals are equipped with the skills and knowledge needed to meet the evolving demands of healthcare, both locally and globally.

The integrated curriculum represents a significant shift in how medical education is delivered, focusing on the interconnection between various disciplines and emphasizing patient-centered care. By blending theoretical knowledge with practical application from the early stages of their education, students are better prepared to understand the complexities of human health and the diverse challenges they will face in their medical careers. This holistic approach is criticalin nurturing well-rounded professionals who are not only adept clinicians but also compassionate caregivers.

Rawalpindi Medical University has always been at the forefront of medical education, and this curriculum reflects its visionary leadership in preparing graduates who are ready to confront the future of healthcare with confidence and competence. I am confident that this initiative will greatly contribute to the advancement of healthcare in Punjab and beyond, ensuring that our doctors are not only skilled but also compassionate and ethical leaders in their field.



Mr. Khawaja Salman Rafique

Minister, Specialized Healthcare & Medical Education Department

The Rawalpindi Medial University, Rawalpindi has consistently evolved and adapted to support its learners, uphold academic standards, and maintain its status as a globally recognized institution. The launch of the 'Modular Curriculum 2024 marks a significant step forward in advancing public health and addressing future healthcare needs. By embracing this curriculum, students and professionals alike will gain the toolsto turn knowledge into practical expertise, positioning themselves as leaders in research, public service, sustainable healthcare, and accessible medical care.

A curriculum's success hinges on the dedication of those who implement it. The true impact of this program will be realized through the joint efforts of educators and learners. I am confident that this integrated educational framework will equip our futuredoctors to confront global health challenges, including emerging disease trends, healthcare equity, and solutions for underserved communities.



**Prof. Dr. Muhammad Umar**Vice Chancellor RMU



**Prof Jahangir Sarwar Khan**Principal RMC

There is no subject which will require more careful consideration in the settlement of the educational details of the University of which RMU is to be the center than that of the choice andarrangement of the curriculum to be required for the degree in medicine. An exceptional opportunity presents itself, you have, within certain limits, a tabula rasa, and it behooves the authorities of the future university to mark it in the manner best calculated to promote the advanceof medical science and the efficiency of medical teaching. If, from an experience acquired as a teacher and examiner in various universities during a period of more than a quarter of a century, I can help in the promotion of these objects, by pointing out virtues which may be emulated here, and failings which may be avoided there. I shall at least feel I have done something to assist in the modelling of what will, we all hope, become one of the great centers of learning of Pakistan.

But whilst endeavoring to sketch out what subjects should form part of the medical curriculum of a university, and to appraise their relative order and value, I do not propose to place before youan ideal which is unattainable under the circumstances of place and time, in which you find yourselves, although it would be easier to construct an ideal curriculum than to plan one out within the limits of present-day practicability. I suppose that the integrated modular curricula nowbeing established in our university will more nearly approach the ideal.

The diverse faculty and student body make our programs earn top national and international reputation. I can say with complete confidence that what makes our university exceptional are the faculty & staff who are dedicated to help our aspiring students to become the compassionate, highly skilled health-care providers of tomorrow.



**Prof, Dr. Ifra Saeed**Professor of Anatomy
Director DME



**Prof, Dr. Ayesha Yousaf**Dean Basic Sciences

This is a great prospect for RMU and curriculum committee to formulate the modular curriculum of basic medical sciences. It is a task, well meant for its contribution in medical education. Hopefully it will go a long way in training the medical graduates, as per required national and international standards of medical education. The Modular teaching is likely to give a fresh and varied approach to learning process and at the end optimizing maximum learning outcomes. This entails coordination, patience, commitment and diligence from all those who are on board, either the faculty or the students. All this seems to be encouraging, yet limited resources, inadequate manpower, and difficulty in breaking traditional shackles are tangible obstacles.

The preparation and implementation of modular curriculum provides the faculty an opportunity to design and reorientate and reconceptualize health—illness process.

Transforming academic stakeholders' learning perspectives and then to translate it in students' development as an effective force of society, well versed with modern day problems, is an uphill task. This is a humble effort in this regard. Still there is lot to distill, crystallize and narrate. Hopefully from this marathon, the curiosity will emerge like a fresh breeze, from here the character will arise in the horizon, as all this at the end is meant to serve the ailing humanity and to accomplish the dream of a healthy society.

At the end, it will be great injustice not to acknowledge the unwavering and untiring support of Prof Dr Muhammad Umar, Vice Chancellor RMU, who is an ardent supporter and promoter of anything which gives a fresh impetus to medical education and practice. It's all because of his continuous input and persuasion, that the modular curriculum achieved fruition.

## **Authors**

**Prof. Muhammad Umar**Vice Chancellor
Rawalpindi Medical University & Allied Hospitals

Prof. Dr. Ifra Saeed
Professor of Anatomy
Director DME
Rawalpindi Medical University

Associate Prof. Dr. Arsalan Manzoor Mughal Additional Assessment Director DME Rawalpindi Medical University

Assistant Prof. Dr. Farzana Fatima Assistant Director DME Rawalpindi Medical University





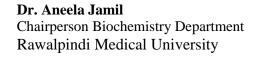


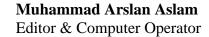


# **Co-Authors**

**Prof. Dr. Samia Sarwar**Chairperson of Physiology
Rawalpindi Medical University

Prof. Dr. Ayesha Yousaf Chairperson Anatomy Department Dean Basic Sciences Rawalpindi Medical University







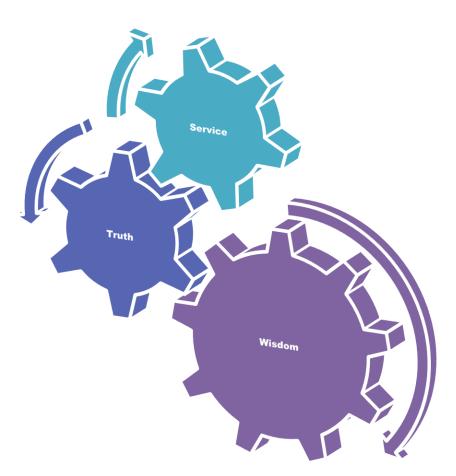






# **University Moto, Vision, Values & Goals**

#### **RMU Motto**



#### **Vision and Values**

Highly recognized and accredited center of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are critical thinkers, experiential self-directed lifelong learners and are socially accountable

#### **Mission Statement**

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

# **Outcomes of the Undergraduate Integrated Modular Curriculum**

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of evidence-based knowledge to help you attain personal and professional growth & excellence.



STAMPA, NERSILLA NERS	Rawalpindi Medical University						
	Doc. Title: Procedure For Control of Documented Information						
NEDICAL S	<b>Document #:</b> RMU-MR-SOP-70	<b>Rev.</b> #: 00	<b>Issue #:</b> 01	<b>Issue Date:</b> 16-09-2024			

### **Procedure For Control of Documented Information**

In-Compliance with **ISO 9001:2015 Clause 7.5** The copyright of this procedure, together with all confidential information contained herein is the sole property of Rawalpindi Medical University. It may be copied in full or in parts only by the Management/personnel and only for Company-related activities. Disclosure of any information contained within this procedure to any person (s) outside the employee of the institute without written permission of the Vice Chancellor or Principal or ISO Committee Head is strictly prohibited.

## **Document Information**

Category First & Second Year Curriculum 2024	
Document	Procedure for Control of Documented Information
Issue	1
Rev	00
Identifier	RMU-MR-SOP-70
Status	Final Document
Author(s)	Director Medical Education, Asst. Director Medical Education,
Reviewer(s) Curriculum Committee.	
Approver(s)	Vice Chancellor
Creation Date	16-09-2024
Effective Date	16-09-2024
Control Status	Controlled
Distribution VC, Principal, ISO Committee	
Disclaimer  This document contains confidential informat distribute this document without prior approval management of <b>Rawalpindi Medical University.</b>	



# Rawalpindi Medical University

**Doc. Title: Procedure For Control of Documented Information** 

**Document #:** RMU-MR-SOP-70 | **Rev. #:** 00

**Issue #:** 01

**Issue Date:** 16-09-2024

# **Document Approval**

Prepared By	Reviewed By	Approved By
Director Medical Education, Asst. Director Medical Education,	Curriculum Committee	Vice Chancellor

# **List of Copy Holders**

<b>Document Code</b>	Issue # /Rev.#	Copy #	Copy Holders	Distribution Mode
RMU-MR-SOP-70	01/00	01	V.C	Email
RMU-MR-SOP-70	01/00	02	<b>HODs</b>	Email
RMU-MR-SOP-70	01/00	03	IC	Hard Copy

## **Document Revision History**

Author(s)	Date	Version	Description
Prof Naeem Akhtar, Dr Ifra Saeed,			Developed for First & Second Year MBBS.
Dr. Ayesha Yousaf, Dr Sidra	2017-2018	1 <sup>st</sup>	Composed of Horizontally and vertically
Hamid, Dr Tehmina Qamar			Integrated Modular Curriculum.
Dr Tehzeeb, Dr Samia Sarwar, Dr			Developed for First & Second MBBS.
Ifra Saeed, Dr. Ayesha Yousaf, Dr	2019-2020	$2^{\text{nd}}$	Horizontally and vertically integrated
Tehmina Qamar, Dr Sidra Hamid			Learning objectives updated
Dr Tehzeeb, Dr Samia Sarwar, , Dr			Developed for First & Second MBBS.
Ifra Saeed, Dr Ayesha Yousaf, Dr	2021-2022	3 <sup>rd</sup>	Horizontally and vertically integrated
Tehmina Qamar, Dr Sidra Hamid			Learning objectives updated,
			Research curriculum incorporated
Dr Tehzeeb, Dr Samia Sarwar, Dr			Developed for First & Second MBBS.
Ifra Saeed, Dr Ayesha Yousaf, Dr	2022-2023	4 <sup>th</sup>	Horizontally and vertically integrated
Tehmina Qamar, Dr Sidra Hamid			Learning objectives updated,
			Research, Bioethics, Family Medicine
			curriculum incorporated along with
			Professionalism
Dr Samia Sarwar, Dr Ifra Saeed, Dr			Developed for First & Second MBBS.
Ayesha Yousaf, Dr Tehmina		5 <sup>th</sup>	Horizontally and vertically integrated
Qamar, Dr Sidra Hamid	2023-2024		Learning objectives updated,
			Research curriculum revamped Bioethics,
			Family Medicine curriculum incorporated
			along with Professionalism.
			Entrepreneurship curriculum incorporated

**Table of Contents** 

# Table of Contents

SECTION-I (Contributors & Developing Team)	18
Members of Syndicate	19
Deans of Faculties & Professors	20
Contributors	21
SECTION-II (Preamble)	25
What is Curriculum?	26
What is a Integrated Medical Curriculum?	27
SECTION-III (RMU Undergraduate Competency Framework)	40
RMU Undergraduate Competency Model	41
SECTION-IV (Structured Framework of Clinically Oriented Integrated Modular Curriculum)	50
First to Final year MBBS Framework	51
First Year Academic Calendar 2024.	52
Contact Hours First Year MBBS	53
Second Year Academic Calendar 2024	54
Contact Hours Second Year MBBS	55
SECTION-V (Spirally Integrated Courses/ General Education (GEC) Courses)	56
Introduction	57
Alignment of RMU Spiral Courses as per HEC Undergraduate Policy 2023 & Guidelines of PMDC 2024	59
SECTION-VI (Teaching & Learning Methodologies / Strategies	67
Prof. Umar's Model Integrated Lecture	
Small Group Discussion (SGD)	69
Seld Directed Learning (SDL)	70
Case Based Learning (CBL)	70

SECTION-VII (First Year MBBS)	71
Block-I (Foundation + MSK-I Module)	72
Module I - Foundation Module	73
Module II–MSK-I Module	131
Block-II (MSK-II + Blood & Immunity Module).	175
Module III – MSK-II Module	176
Module IV- Blood and Immunity Module	222
Block-III (CVS + Respiratory Module).	269
Module V – CVS Module	270
Module VI – Respiratory Module	329
SECTION-VIII (Second Year MBBS)	376
Block-IV (GIT + Renal Module)	377
Module VII – GIT Module	378
Module VIII – Renal Module	434
Block-V (Reproduction + CNS Module).	472
Module IX – Reproduction Module	473
Module X – CNS Module.	518
Block-VI (Special Senses + Endocrinology Module)	587
Module XI – Special Senses Module	588
Module XII – Endocrinology Module	634
SECTION-IX	679
Learning Resources	680
SECTION-X (Assessment Polices)	683
Formative Assessment	684

Summative Assessment	634
Internal Assessment	687
Γable of Specification (TOS) for Module Examination for First & Second Year MBBS	688
SECTION-XI (Feedback and Evaluation)	699
Internal Feedback	
Formal Feedback	



# **Members of Syndicate**

Sr. No	Members					
1.	The Minister for SHC & ME Department, Punjab / Pro Chancellor, Rawalpindi Medical University, Rawalpindi.					
2.	The Secretary to Government of the Punjab, SHC & ME Department, Lahore					
3.	The Secretary to Government of the Punjab, Finance Department, Lahore					
4.	The Secretary to Government of the Punjab, Higher Education Department, Lahore					
5.	The Secretary to Government of the Punjab, Law & Parliamentary Affairs Department, Lahore					
6.	The Chairman Higher Education Commission, Sector H-9, Islamabad					
7.	Prof. Fareed Minhas, Ex, Professor of Psychiatry, RMC, Rawalpindi.					
8.	Prof. Syed Irfan Ahmed, Ex-Professor of Medicine, RMC, Rawalpindi					
9.	Syed Bakhtiyar Kazmi, Partner KPMG Taseer Hadi & Co					
10.	Dr. Muhammad Saqib Abbasi, Rawalian Alumini					
11.	The Medical Superintendent, Holy Family Hospital, Rawalpindi					
12.	The Principal, College of Nursing Holy Family Hospital, Rawalpindi					
13.	The Vice Chancellor Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi					
14.	The Vice Chancellor National University of Science & Technology (NUST), Islamabad					

# **Deans of Faculties & Professors**

Sr. No	Name	Department	Sr. No	Name	Department	Sr. No	Name	Department
1.	Prof. Dr. Muhammad Umar	Vice Chancellor	19.	Prof. Dr. Asad Tameez-ud-Din	Psychiatry	37.	Dr. Hasnain Khan	Plastic Surgery
2.	Prof. Dr. Jahangir Sarwar Khan	Principal	20.	Prof. Dr. Zein El Aamir	Urology	38.	Dr. Obaid ur Rehman	Orthopedics
3.	Prof. Dr. Muhammad Khurram	Medicine	21.	Prof. Dr. Wafa Omer	Pathology	39.	Dr. Muhammad Mujeeb Khan	Infection Disease
4.	Prof. Akram Randhawa	Pharmacology	22.	Dr. Jawad Zaheer	Anesthesia	40.	Dr. Aneela Jamil	Biochemistry
5.	Prof. Rai Muhammad Ashgar	Peads	23.	Dr. Ashraf Mehmood	Neurosurgery	41.	Dr. Muhammad Asad	Cardiology
6.	Prof. Shagufta Saeed	Gynae/Obs	24.	Dr. Ahmed Hassan	ENT	42.	Dr. Shawana Sharif	Dermatology
7.	Prof. Riaz Ahmed Sheikh	Orthopedic Surgery	25.	Dr. Sadia Chaudhry	ENT	43.	Dr. Faran Maqbool	, Medicine
8.	Prof. Dr. Mobina Ahsan Dodhy	Pathology	26.	Dr. Muhammad Shahzad Manzoor	, Medicine	44.	Dr. Abeera Zareen	Anesthesia
9.	Prof. Dr. Naeem Akhtar	Pathology	27.	Dr. Faryal Azhar	Surgery	45.	Dr. Hina Sattar	Peads
10.	Prof. Dr. Samia Sarwar	Physiology	28.	Dr. Usman Qureshi	Surgery	46.	Dr. Raja Asif Masood	Nephrology
11.	Prof. Dr. Nousheen Qureshi	ENT	29.	Dr. Saima Ambreen	Medicine	47.	Dr. Sadia Azam Khan	Family Medicine
12.	Prof. Dr. Naveed Akhtar Malik	Surgery	30.	Dr. Sadia Khan	Gynae	48.	Dr. Rehman Rasool	, Orthopedics
13.	Prof. Dr. Waqas Raza	Surgery	31.	Dr. Rubaba Abid	Gynae	49.	Dr. Saad Riaz	Orthopedics
14.	Prof. Dr. Tallat Farkhanda	Gynae /Obs	32.	Dr. Humera Noreen	Gynae	50.	Dr. Israr Liaquat	Peads
15.	Prof. Dr. Nasir Khan	Radiology	33.	Dr. Tanveer Husain	Gastroenterology	51.	Dr. Arshad Rabbani	Medicine
16.	Prof. Dr. Ayesha Yousaf	Anatomy	34.	Dr. Hasnain Khan	Plastic Surgery	52.	Dr. Hasnain Khan	Plastic Surgery
17.	Prof. Dr. Ifra Saeed	Anatomy/DME	35.	Dr. Mudassar Faiz Gondal	Peads Surgery	53.	Dr. Obaid ur Rehman	Orthopedics
18.	Prof. Dr. Fuad Ahmad Khan Niazi	, Ophthalmology	36.	Dr. Asma Khan	Pharmacology	54.	Dr. Muhammad Mujeeb Khan	Infection Disease

# **Contributors**

Department of Medicine	Department of Surgery	Department of Plastic Surgery
Prof. Muhammad Umar Vice Chancellor	Professor. Dr. Jahangir Sarwar Khan (Principal)	Assistant Prof. Dr. Husnain Khan
Professor. Dr. Muhammad Khurram	Professor. Dr. M. Waqas Raza	Department of Gastroenterology
Associate Prof. Dr. Shahzad Manzoor	Professor. Dr. Anis Ahmed	Associate. Prof. Dr. Tanveer Hussain
Associate Prof. Dr. Saima Ambreen	Associate. Prof. Dr Usman Qureshi	Assistant. Prof. Sadia Ahmed
Associate Prof. Dr. Muhammad Arif	Associate Prof. Dr. Gohar Rasheed	Department of Cardiology
Associate. Prof. Dr. Lubna Meraj	Associate Prof. Dr. Faryal Azhar	Assistant. Prof. Dr. Muhammad Asad
Assistant Dr. Mujeeb Khan	Associate Prof. Dr M. Zafar Iqbal	Department of Obs/Gynae
Assistant. Prof. Dr. Faran Maqbool	Assistant. Prof. Dr. Muhammad Atif	Professor. Dr. Tallat Farkhanda
Assistant Prof. Nida Anjum	Assistant. Prof. Dr Huma Sabir Khan	Associate. Prof. Dr Sadia Khan
Department of ENT	Assistant Prof. Dr. Syed Rahat Hassan	Associate. Prof. Dr. Humera Noreen
Professor. Dr. Nousheen Qureshi	Assistant Prof. Dr. Asifa Dian	Associate. Prof. Dr. Rubaba Abid Naqvi
Associate Prof. Dr. Ahmad Hassan Ashfaq	Department of Pediatrics Surgery	Associate Prof. Dr Sobia Nawaz
Associate Prof. Dr. Sadia Chaudhry	Associate Prof. Dr. Mudasser Faiz Gondal	Assistant. Prof. Dr. Humaira Bilqis
Assistant. Prof. Dr. Haitham Akaash	Assistant Prof. Dr. Mahwish Khan	Assistant. Prof. Dr. Saima Bibi
Assistant. Prof. Dr. Muhammad Arshad	Department of Pediatrics	Assistant. Prof. Dr Maliha Sadaf
Assistant Prof. Dr. Ashar Alamgir	Assistant Prof. Dr. Hina Sattar	Assistant. Prof. Dr Khansa Iqbal
Assistant Prof. Dr. Tabassum Aziz	Assistant Prof. Dr. Aqeela Ayub	Assistant Prof. Dr. Amara Arooj
Assistant Prof. Dr. Nida Riaz	Assistant Prof. Dr. Jawaria Zain	Assistant. Prof. Dr. Shama Bashir
Department of Psychiatry	Assistant Prof. Dr. Asad Shabbir	Assistant Prof. Dr. Aqsa Ikram
Prof. Dr. Asad Tamis ud Din	Assistant Prof. Dr. Israr Liaqat	Assistant. Prof. Dr. Nighat Naheed
Associate Prof. Dr. Muhammad Kashif	Department of Urology	Assistant. Prof. Dr. Farah Deeba
Assistant Prof. Dr. Mahmood Ali Khan Jafri	Associate Prof. Dr. Zain-ul-Aamir	Dr. Ismat Batool S.R BBH

Assistant Prof. Dr. Sadia Majid	Associate Prof. Dr. Zeeshan Qadeer	Department of Orthopedics
Assistant Prof. Dr. Qurat ul Ain	Department of Dermatology	Associate Prof. Dr. Obaid-Ur-Rahman
Assistant Prof. Dr. Azeem Khan	Assistant Prof. Dr. Shawana Sharif	Assistant Prof. Dr. Rehman Rasool Akhtar
Department of Neurosurgery	Department of Pathology	Assistant Prof. Dr. Saad Riaz
Associate Prof. Dr. Ashraf Mahmood	Professor. Dr. Naeem Akhtar	Assistant Prof. Dr. Muhammad Hassan
Assistant Prof. Dr. Soban Sarwar Gondal	Professor. Dr. Mobina Ahsan Dodhy	Department of Anesthesiology
Department of Radiology	Associate Prof. Dr. Mudassira Zahid	Associate Prof. Dr. Jawad Zahir
Professor Dr. Nasir Khan	Assistant Prof. kiran Fatima	Assistant Prof. Dr. Abeera Zareen
Associate Prof. Dr. Hina Hanif Mughal	Assistant Prof Fatima Tuz Zahra	Assistant. Prof. Dr. Waqas Anjum
Assistant Prof. Dr. Anum Zahoor	Assistant Prof. Dr. Rabbia Khalid Latif	Assistant Prof. Dr. Anum Malik
Assistant Prof. Dr. Faisal Mehmood	Dr. Abid Hassan APMO	Assistant Prof. Dr. Ayesha Mansoor
Assistant Prof. Dr. Hina Hafeez Abbasi	Dr. Uzma Zaffar APWMO	Department of Pharmacology
Assistant Prof. Dr. Beenish Nadeem	Dr. Jaweriya Qaiser APWMO	Prof. Dr. Akram Randhawa
Assistant Prof. Dr. Riffat Raja	Dr. Faiza Zafar S.W.D	Associate Prof. Dr. Asma Khan
Dr. Aniqa Saleem S.R, HFH	Dr. Syed Iqbal Haider S.D	Assistant Prof. Dr. Attiya Munir
Dr. Saba Binte Kashmir S.R HFH	Dr. Syed M. Ali S.D	Assistant Prof. Dr. Zunera Hakim
Dr. Jehangir Khan	Dr. Mehreen Fatima DEMO	Assistant Prof. Dr. Sfanila Akhter
Dr.Sana Yaqoob S.R	Dr. Nida Fatima Syed DEMO	Dr. Arsheen Arshad DEMO
Dr. Nadiha Maryam S.R BBH	Dr. Sara Rafi DEMO	DR. Muhammad Zaheer shaikh DEMO
Department of Physiology	Dr Syeda Aisha DEMO	Dr. Omaima Asif DEMO
Professor Dr. Samia Sarwar	Dr. Muhammad Shabih Haider Demo	Dr. Zoofashan Fatima Demo
Associate Dr. Faizania Shabbir	Dr. Unaiza Aslam S.W.D	Dr. Memuna Kanwal Demo
Assistant Prof. Dr. Sidra Hamid	Dr. Kiran Ahmad S.D	Dr. Haseeba Talat DEMO
Associate Prof. Faizania Shabir	Dr. Rabia Anjum	Dr. Rubina Kauser S.D
Dr. Sheena Tariq APMO	Dr. Saroor-e-Syma DEMO	Dr. Uzma Umar S.D

Dr. Fareed Ullah Khan S.D	Dr. Faiza Sahar SWMO	Dr. Ayesha Anwar
Dr. Kamil Tahir S.D	Dr. Tahira Jabeen	Qurat-ul-Ain
Dr. Uzma Kiani S.W.D	Dr. Mahjabeen	Dr. Saba Sarfaraz
Dr. Fahad Anwar Demonstrator	Dr. Laraib Khatoon	Department of Biochemistry
Dr. Jawad Hasan Demo	Dr. Saira Karim	Assistant Prof. Dr. Aneela Jamil
Dr. Nazia Mumtaz Demo	Dr. Khuzeema Tanveer	Dr. Rahat Afzal APWMO
Dr. Aneela Yasmeen S.D	Department of Anatomy	Dr. Kashif Rauf S.D
Dr. Shazia Nosheen S.D	Professor Dr. Ayesha Yousaf	Dr Nayab Ramzan S.W.D
Dr. Uzma Kiani DEMO	Professor Dr. Ifra Saeed	Dr. Romessa Naeem DEMO
Dr. Najamul Sehar Javed	Associate Prof. Dr. Mohtasham Hina	Dr. Almas Ajaz S.D
Department of Eye.	Assistant Prof. Dr. Arsalan Manzoor Mughal	Dr. Uzma Zafar
Prof. Dr. Fauad Ahmad Khan Naizi	Assistant Prof. Dr. Maria Tasleem	Dr. Rohina Khalid
Assistant Prof. Dr. Ambreen Gul	Dr. Gaiti Ara Saeed APWMO	Dr. Sana Latif
Assistant Prof. Dr. Sidra Jabeen	Dr. Saadia Baqir APWMO	Department of Nephrology
Department of Community Medicine	DR. ALI RAZA, S.D	Assistant Prof. Dr. Sana Kifayat
Prof. Dr. Arshad Sabir	Dr. Muhammad Tariq Furqan S.D	Assistant Prof. Dr. Noman Butt
Associate Prof. Dr. Khola Noreen	Dr. Sajjad Hussain S.D	Assistant Prof. Dr. Asmara Asrar
Associate Prof. Dr. Sana Bilal	Dr. Kashif Ashraf S.D	Department of Forensic Medicine
Assistant Prof. Dr. Rizwana Shahid	Dr. Qurat ul Ain Sharif S.W.D	Associate Prof. Dr. Romana Malik
Assistant Prof. Dr. Afifa Kulsoom	Dr. Saira Aijaz S.W.D	Assistant Prof. Dr. Filza Ali
Assistant Prof M. Imran Younas	Dr. Minahil Haq Demo	Dr. Shahida Bashir APWMO
Assistant Prof. Gul Mehar Javaid	Dr. Urooj Shah DEMO	DR. Gulzaib Pervaiz APWMO
Assistant Prof. Dr. Farrah Pervaiz	Dr. Zeneara Saqib DEMO	Dr. Naila Batool APWMO

Assistant Prof. Dr. Mehwish Riaz	Department of Medical Education	Dr. Syeda Fatima
Dr. Farhan Hassan S.D	Prof. Dr. Ifra Saeed (Director DME)	Dr. Shahrukh Khan S.D
Dr. Abdul Qudoos S.D	Asso. Dr. Arsalan Manzoor Mughal (Additional Director of Assessments)	Dr. Urooj Shah DEMO
Dr. Asif Maqbool Butt Demo	Dr. Farzana Fatima (Assistant Director DME OTB)	Dr. Roohina Saeed
Dr. Imrana Saeed S.D	Dr. Omaima Asif (Assistant Director DME NTB)	Department of Critical Care
Dr. Narjis zaidi S,D	Dr. Maryam S.W.M.O	Associate Prof. Dr. Abrar Akbar
Dr. Moniba Iqbal PGT	Dr Saira Aijaz Demonstrator	Department of Family Medicine
Dr. Bushra Farooq PGR		Assistant Prof. Dr. Sadia Azam Khan
Dr. Zaira Azhar PGR		Department of Neurology
Dr. Saba Maryam PGR		Assistant Prof. Dr. Waqas Ahmed
Dr. Ayesha zujaja PGR		Department of Pulmonology
Dr. Maria Jabeen PGR		Assistant Prof. Dr. Zaid Umar



Welcome to the fourth edition of the Clinically Oriented Integrated Modular Curriculum for the MBBS students at Rawalpindi Medical University. This revised version is tailored to integrate clinical insights from the very beginning, ensuring a more practical and application-focused approach to the fundamental medical sciences. At Rawalpindi Medical University, we are committed to providing a curriculum that not only covers the essential theoretical knowledge but also emphasizes the development of critical clinical skills necessary for future medical professionals. This curriculum is designed to foster a deep understanding of human biology and the pathophysiological processes, combined with hands-on clinical experiences that contextualize theoretical knowledge in real-world medical settings.

Version IV of the curriculum incorporates the latest advancements in medical education and reflects changes in the medical landscape, ensuring our students are well-prepared to meet the challenges of modern healthcare environments. With a focus on interdisciplinary learning and ethical practice, we aim to equip our students with the competence and compassion required to excel in their future careers.

We trust that this curriculum will inspire and challenge you to reach new heights in medical education and beyond. Welcome to a journey of learning that promises to be as rewarding as it is demanding.

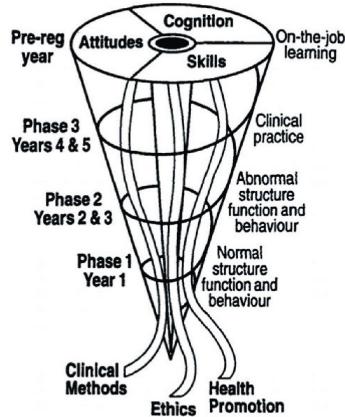
### What is curriculum?

According to definition curriculum can be classified into five categories:

- 1. Curriculum as a product program, document, electronic media, or multimedia
- 2. Curriculum as a program of study usually courses offered, curriculum sequences of study instandards as benchmarks, gateways,
- 3. Curriculum as intended learnings goals, content, concepts, generalizations, outcomes
- 4. Curriculum as experiences of the learner activities, planned and unplanned.
- 5. Hidden curriculum what students learn that isn't planned unless you plan for this or is itpossible?

## What is a Integrated Medical Curriculum?

Shoemaker defines an integrated curriculum as "education that is organized in such a way that it cuts across subject matter lines, bringing together various aspects of the curriculum into meaningful association to focus upon broad areas of study." There is an ongoing discussion aboutwhether medical curriculum should be discipline based or integrated. Most curricula for medical education have been integrated horizontally and vertically—vertically between basic and clinical sciences. The Flexnerian curriculum has disappeared to permit integration between basic sciences and clinical sciences, which are taught throughout the curriculum. We have proposed a different form of integration where the horizontal axis represents the defined learning outcomes and the vertical axis represents the teaching of the sciences throughout the courses. We believe that a mere integration of basic and clinical sciences is not enough because it is necessary to emphasize the importance of humanism as well as health population sciences in medicine. It is necessary to integrate basic and clinical sciences, humanism, and health population in the vertical axis, not only in the early years but also throughout the curriculum, presupposing the use of active teaching methods based on problems or cases in smallgroups.



The method of teaching medicine, since Flexner's days, implies that students should first learn basic and biomedical

sciences and then move to clinical sciences; however, this is not how patients are presented. A common criticism of this approach is that students will not see the relevance of basic and biomedical sciences applied to clinical practice, and it is preferable to encourage students to think as doctors from the day they enter medical school.

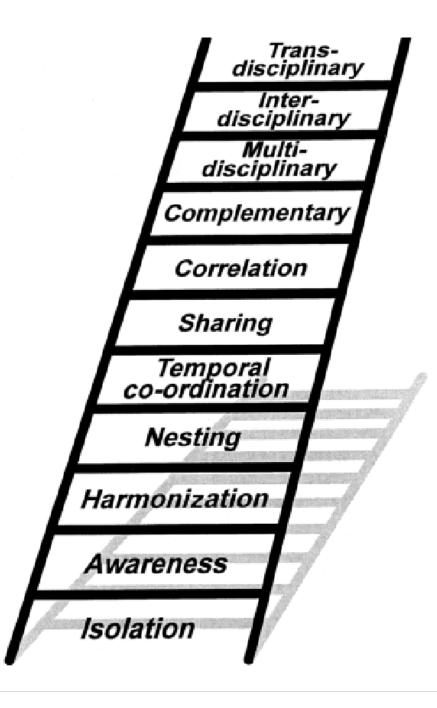
Integration is therefore of key importance for medical education because basic science learning isplaced in the context of clinical and professional practice and is considered by students to be moremeaningful and relevant. In the vast majority of curriculum reforms, vertical integration combinesbasic and clinical sciences, early clinical experience, clinician—scientist partnerships, and incorporation of sciences in the later years of the course. This is undoubtedly an advantage, but isbased on a biologist's vision of the health-illness process

## **Levels of Integration**

At Rawalpindi Medical University, our curriculum for the MBBS program adheres to the sophisticated model of Correlation, recognized as level 7 on Harden's scale of integration. This approach is foundational throughout the initial four years of the medical education journey. Our emphasis predominantly remains on discipline-specific education, where courses focused on individual subjects constitute the majority of the curriculum. This traditional structure ensures a robust foundation in the core medical sciences.

Within this discipline-oriented framework, we introduce an innovative element—an integrated teaching session. These sessions are strategically designed to bridge various subjects by identifying and connecting areas of mutual relevance. This method facilitates a holistic learning experience by correlating distinct disciplines and embedding them within a clinical context. This integration enhances the students' understanding and application of medical concepts, making the learning process both comprehensive and applicable to real-world scenarios.

As our students progress through their education, the degree of clinical teaching intensifies. This gradual increase is deliberate, ensuring that by the time our students reach their final year, they are well-prepared to engage in extensive clerkships. Year V is exclusively devoted to these clerkships, offering students hands-on, practical experience in a variety of clinical settings. This exposure is crucial for the development of competent and empathetic future physicians who are equipped to meet the diverse needs of their patients and the healthcare system at large.



## **PMDC Seven Star Doctor Competencies**

At RMU we aim to produce seven-star doctor according to PMDC Competencies having the generic competencies of "Skill, Knowledge, Community Health Promoter, Critical Thinker, Professional, Scholar, Leader and Role Model", Rawalpindi Medical University has introduced modular integrated undergraduate curriculum as being first public sector university. These competencies are further outlined by various enabling traits specifying knowledge, skills, and attitude.

#### Contextualization in the curriculum

It involves incorporating both local needs and global standards. This ensures the curriculum's relevance to the local community while adhering to international benchmarks. For health professionals, this is crucial as it equips students to effectively serve diverse populations in real-world healthcare settings.

Content identification, contextualization, and validation during curriculum development require a balanced consideration of local and global requirements, overseen by relevant leaders and experts. To this end, Rawalpindi Medical University has engaged subject experts and medical educationists, planning to incorporate feedback from local stakeholders to address the current needs effectively.

In Pakistan, the shift towards contextualization is essential, particularly due to the country's unique healthcare challenges like infectious diseases, malnutrition, and maternal and child mortality,

RMU 7 Star Doctor Clinical Reasoning Diagnostic Reasoning Skillful TRUTH Educational Proficiency Research Competence MEDICAL

compounded by socioeconomic factors. The prevalence of various diseases, limited healthcare resources, and cultural diversity necessitate a customized approach to medical education.

Contextualizing the curriculum is expected to positively influence graduate performance. By blending basic and clinical subjects, introducing early clinical exposure, and emphasizing practical, context-aware learning, graduates will be better equipped to tackle health challenges in their communities, enhancing their competence, confidence, and ability to deliver high-quality healthcare.

## Context Facets of Curriculum 2024 at Rawalpindi Medical University

Rawalpindi Medical University adheres to globally recognized best practices in curriculum development. The Department of Medical Education at RMU has structured the process of syllabi identification, thematic structuring, content validation, and contextualization. This process integrates existing teaching and learning practices with global recommendations for change.

Key perspectives for the context of change include:

- •The exponential growth in course content due to educational advancements, technological innovations, and scientific discoveries requires prioritization, removal of outdated concepts, and modern information transfer methods.
- •Evolving societal expectations of healthcare workers necessitate balancing patient satisfaction with health system responsiveness. The curriculum should address societal needs, healthcare access, resource equity, and system awareness.
- •The post-pandemic era's shift towards hybrid learning and online methodologies necessitates a curriculum that accommodates these new educational paradigms.
- •The curriculum revision is aligned with global standards of Basic Medical Education and conforms to national regulations, ensuring international recognition and employability.
- •The curriculum incorporates training in the affective domain to address societal expectations, legal awareness, and community interaction. This includes a dedicated 'spiral' for affective training, with assessments for the 'PERLs' domain.
- •Student-centered approaches, such as Problem-Based Learning, electives, self-directed learning, and portfolio development, empower students in their educational journey.

## **Process of Curriculum Development**

The curriculum development process at Rawalpindi Medical University was an intricate and well-orchestrated endeavor, meticulously designed to create an advanced and relevant curriculum. This process maintained a strong linkage with existing educational norms and professional practices while introducing innovative elements. Here's a more detailed breakdown of the process:

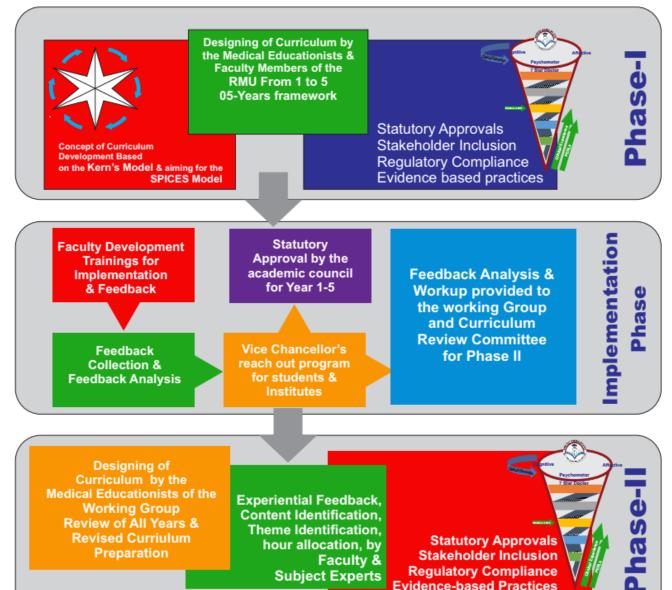
- 1. **Syllabi Development and Expert Consultation**: The first stage involved the formation of subject-specific advisory committees, engaging over 34 experts. Each committee focused on curating and refining the syllabi for their respective subjects. Their primary task was to incorporate all critical elements pertinent to each subject while discarding any obsolete or irrelevant content.
- 2. **Curricular Committee Review**: The next phase brought together a 26-member Curricular Steering Committee, consisting of medical educationists This committee played a pivotal role in scrutinizing and endorsing the overarching structure for a 'Modular Integrated Curriculum' spanning five years. Their focus areas included the identification and placement of modules, clerkship planning, and ensuring that the curriculum aligned seamlessly with various assessment techniques.
- 3. **Theme Identification and Modular Design**: In this phase, 18 medical educators engaged in a dynamic and collaborative exercise. They meticulously arranged syllabi elements into specific modules according to these themes. This step was crucial in determining the topics for each learning objective and allocating appropriate hours for each curriculum component.



- 4. **Finalization of Modules**: A select group comprising Lead Medical Educationists and members from the Department of Medical Education undertook the final step of module finalization. This involved setting the structure, themes, time allocation, syllabi content, and emphasizing clinical relevance for each module.
- 5. **Statutory Approval and Integration**: The finalized modules and their associated assessment policies underwent a rigorous approval process through the Academic Council, and the Syndicate. Feedback and recommendations gathered during this statutory process were meticulously integrated into the curriculum guidelines.

- 6. Adaptive and Feedback-Oriented Approach: Recognizing the importance of adaptability and continuous improvement, the university incorporated a system for regular feedback and curricular evaluations. This system ensures that the curriculum remains dynamic, accommodating necessary updates and refinements as needed.
- 7. Curriculum 2024 A Modular Integrated Outcome-Based Approach: The developed Curriculum is a testament to a comprehensive, outcome-based educational strategy. This strategy enables affiliated colleges to implement the curriculum effectively, respecting each institution's unique identity and vision, despite variations in available resources.
- 8. Integrative and Contemporary Educational Strategies: The curriculum emphasizes both horizontal integration across various disciplines and vertical integration throughout different educational stages. This integrative approach is in line with modern educational theories, like Meizrow's concept of transformative learning and strategies for early clinical exposure. Such an approach is aimed at promoting professional growth and practical knowledge application among students.

In essence, the curriculum development at Rawalpindi Medical University was a detailed, step-by-step process involving extensive expert input, iterative refinement, and a focus on adaptability and modern educational practices



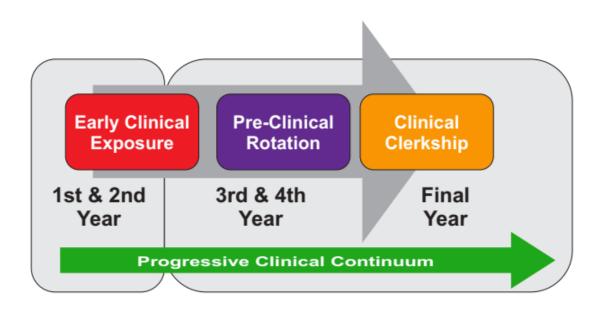
**Feed Back based Modifications** 

# **Curricular Organization and Structure**

RMU will follow the Correlation approach, corresponding to level 7 of Harden's levels of integration. The emphasis remains on disciplines or subjects, with subject-based courses occupying most of the curriculum time. Within this framework, an integrated teaching session or course is introduced, in addition to the subject-based teaching. This session brings together areas of interest common to each of the subjects. Although the teaching is discipline-based, topics are correlated and taught within a clinical context for better understanding and application of concepts. However, clinical teaching increases gradually with advancing years. The fifth year of the MBBS program is dedicated to clerkships.

# **Integrated Curriculum Design of RMU MBBS Program**

Two designs of the MBBS curriculum are acceptable by PMDC. System Based (Preferred) with horizontal and vertical integration. The curriculum of each Clinical Discipline must emphasize-Health Promotion and Disease Prevention<sup>||</sup>, besides Curative Health Care. RMU has opted for system based modular curriculum.

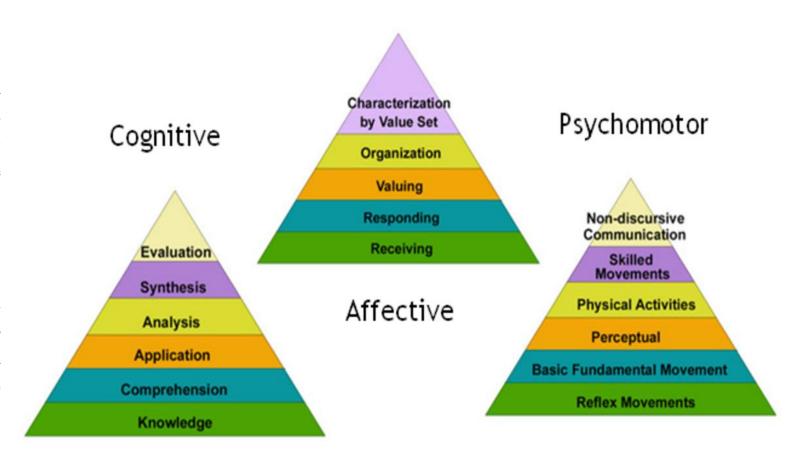


The Module: Module is the smallest unit of Curriculum both in the System- Based and Subject-Base (topic-based) Curricula. Modules are taught as a continuous block or as a longitudinal theme and assessments is carried out at the end of each module. The System-Based Curriculum made up of —Modules, where each module is based upon organ-system(s) of the body. In each module, the Basic and Clinical Sciences are taught and learned in an integrated fashion in RMU we are following the system-based curriculum.

### The Module should explicit makes:

Title of Module of a System 2) Learning Objectives, 3) Allocated Time in weeks/Hours and Credit Hours, 4) the name of the Coordinator, 5) Teaching Faculty (regular/visiting) 6) Learning Sites, 8) Modes of Information Transfer, 9) List of the Recommended Books, 10) Assessment strategies, and 11) Strategies for Monitoring and Improvement.

**Learning Objectives**: Learning Objectives are defined for each module. They are Specific, Measurable, Achievable, Relevant to the desired competencies (Outcomes) of the PMDC Curriculum and Time bound (SMART), related to level of the learner and the three main domains.



**Level of the Learner:** While developing the curriculum, the learning objectives are according to the desired level of the learner, and the assessment systems must assess the knowledge, skills and attitudes to be achieved for that level.

- a. The RMU MBBS curriculum in the first four years will be delivered in a System-Based Modular Format with clinical relevance and early clinical Exposure. However, in the third and fourth years, students will gain clinical exposure through rotations in the wards and outpatient departments (OPDs), and in the fifth year through clerkships.
- b. The curriculum will be delivered by modular teams consisting of multidisciplinary basic science faculty and relevant clinical faculty.
- d. The planning and delivery will be coordinated by Module Team who will guide module coordinators of their respective modules for efficient implementation.
- e. The Modular Coordinator will be responsible for teaching and assessment during each module. The coordinator will be appointed by the Heads of Departments (HODs) in coordination with the Health Professions Education (HPE) team.
- f. The Clinical Coordinator will be responsible for placement, teaching, and assessment during clinical rotations

# The Theoretical Frameworks Shaping the RMU Integrated Modular Curriculum

# The Changing concept of Curriculum in Medical Education

The way medical curricula are structured and taught has undergone significant changes in recent decades. New approaches to education have resulted in a more cohesive curriculum that emphasizes the teacher's role as a facilitator of learning rather than a source of information. Students are now seen as active participants in the learning process rather than mere recipients of knowledge. The responsibility for curriculum planning has shifted from individual departments to committees representing different stakeholders. Key issues that need to be addressed include the mission of the medical school, learning outcomes, curriculum content, course sequence, educational strategies, teaching and learning methods, assessment procedures, educational environment, communication about the curriculum, and management of the process. The SPICES model describes a range of educational strategies that move from student-centered to teacher-centered, problem-based to information-centered, integrated to discipline-based, community-based to hospital-based, and from electives to uniform and systematic to opportunistic. (Figure-1)

S Student-centred	Teacher-centred
P Presentation-based	Information-oriented
Integrated or inter-professional	Discipline-based
C Community-based	Hospital-based
Elective-driven	Uniform
S Systematic	Opportunistic

Spices Model of Educational Strategies

(Essential Skills For A Medical Teacher, Second Edition, Ronald M. Harden)

# **Creating an Authentic Curriculum**

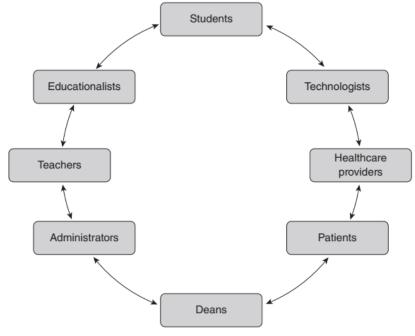
The concept of an authentic curriculum in medical education is gaining importance worldwide. In line with this, Rawalpindi Medical University has also made efforts to create a curriculum that is relevant and responsive to the needs of society and the healthcare system. The university has recognized the need for medical education to keep pace with the changing healthcare landscape, and has adopted an outcome- or competency-based approach to education. This means that the curriculum is designed to produce graduates who are not only knowledgeable but also equipped with essential clinical skills, communication skills, and professionalism. To achieve this, the university has incorporated learning outcomes such as Leadership, Professionalism, Communication skills, Research skills and Bioethics in addition core objectives. Regular Case Based and Problem based learning sessions developed with a local context develops the ability of translating theory to practice since undergraduate years. By adopting an authentic curriculum, Rawalpindi Medical University aims to ensure that its graduates are well-prepared to practice effectively for the benefit of their patients and the community at large.

#### **Collaborative Activities in the Curriculum**

Rawalpindi Medical University recognizes the importance of collaboration in enhancing medical education. In order to achieve this, the university has established a collaborative approach among different stakeholders, including students, faculty, healthcare professionals, and the community.

One of the ways that Rawalpindi Medical University fosters collaboration is by implementing horizontal and vertical integration in the medical curriculum on the continuum of the integration ladder. (Figure 2) By integrating subjects that are normally taught in the same phase of the curriculum, such as anatomy, physiology, biochemistry, surgery, paediatrics, obstetrics, and gynecology, students gain a more comprehensive understanding of medical concepts. Moreover, students are introduced to patients from the first year of the curriculum, allowing them to apply their knowledge in clinical settings.

In addition, the university believes that collaboration should extend beyond the different subject experts
working together to deliver an integrated program. All stakeholders, including students, faculty, healthcare
professionals, and the community, should work together in the planning and implementing of a curriculum. (Figure 3) They collaborate in specifying learning outcomes, planning the approaches to teaching, learning, and assessment, and evaluating the effectiveness of the program.



The stakeholders in curriculum development.

(Mennin, Stewart, and Ronald Harden. Routledge international

handbook of medical education., 2016. Pg 120)

Furthermore, Rawalpindi Medical University recognizes that collaboration is necessary across the different phases of education, including undergraduate, postgraduate, and continuing education. By breaking down silos and fostering communication between these different phases, the university ensures a higher level of collaboration and progress. This collaborative approach to medical education ensures that students graduate with the necessary skills and knowledge to meet the changing needs of the community.

#### **The Involved Student**

In Rawalpindi Medical University, students play a crucial role in the curriculum. There has been a shift in the perception of the student's role, where they are no longer seen as mere products of the education system, but as active partners in the learning process. The focus is on student-centered learning, where the emphasis is on what the students learn rather than what the teachers teach.

To facilitate this, the university provides study guides and clear statements of the expected learning outcomes, encouraging students to take responsibility for their own learning. The university also supports personalized adaptive learning, recognizing that each student is different in terms of their abilities, previous experiences, learning styles, and aspirations.

The university has implemented various strategies, including problem-based learning, case-based learning, peer-to-peer learning and flipped classrooms, to support student-centered learning. Students are also actively engaged in the educational program, serving on committees, participating in policy decisions, and shaping the teaching and learning experience.

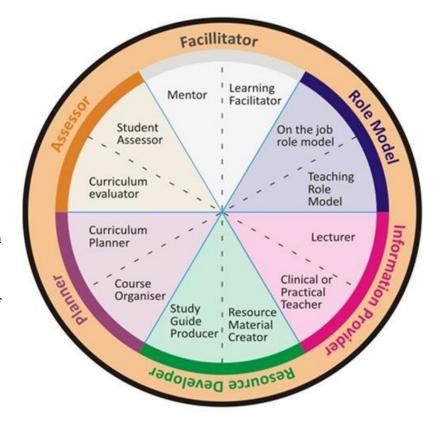
In Rawalpindi Medical University, students have the opportunity to engage in the research program, representing the school and contributing to national and international education seminars. They may also be involved in the delivery of the teaching program as peer teachers or developers of learning resources. Overall, students in Rawalpindi Medical University are valued partners in the learning process, actively engaged in shaping their educational experience.

#### A broader role of Teachers

Rawalpindi Medical University places great importance on the role of the teacher in the success of a curriculum. We understand that the input of the teacher is as significant, if not more significant, than the design of the curriculum itself. Therefore, we prioritize the training and development of our faculty through a regular faculty development program to ensure that they are equipped with the necessary knowledge and skills to effectively teach our students.

Our teachers play multiple roles in the curriculum, including that of information provider, role model, facilitator of learning, assessor of student progress, and curriculum planner. (Figure 4) They are not simply lecturers, but rather mentors and guides who help our students navigate the complex world of medicine. They work tirelessly to create an educational environment that supports the learning of our students and encourages appropriate learning behavior.

Our teachers also serve as facilitators of learning, guiding our students to access, select, and evaluate a wide range of resources that will help them achieve their learning outcomes. They work with individual students to support, motivate, and inspire them, promoting a sense of ownership of the course and their studies.



12 Roles of a Medical Teacher (adapted from Harden, R.M., Crosby, J.R., 2000. AMEE Educational Guide No. 20)

As assessors of student progress, our teachers monitor the progression of our students through the curriculum, identifying any problems related to their progress and guiding their studies to meet their individual needs. They provide feedback and support to students who may require remedial teaching, as well as guidance to those who have mastered a topic and are ready to explore more advanced areas.

Finally, our teachers are integral to the development of our authentic curriculum, which mirrors the mission of our medical school and relates to the needs of our community. They work collaboratively to ensure that our curriculum is up-to-date, relevant, and responsive to the changing landscape of healthcare.

At Rawalpindi Medical University, we recognize the critical role that our teachers play in the success of our curriculum and, ultimately, in the success of our students. We are committed to providing them with the training, resources, and support they need to continue to be effective mentors, guides, and role models for our future medical professionals.



**RMU Undergraduate Competency Framework** 

The focus of this curriculum is on the roles of a general physician, as identified by the PMDC. These roles include being skillful, knowledgeable, a community health promoter, a critical thinker, a professional and role model, a researcher, and a leader. The competencies emphasized in the first and second years align with these roles.



# RMU Competency Framework

#### **RMU Undergraduate Competency Model**

The Rawalpindi Medical University (RMU) Undergraduate Competency Model is designed to prepare medical students to meet the evolving challenges of modern healthcare. Grounded in the principles of patient-centered care, ethical practice, and community engagement, this model outlines the core competencies that every RMU graduate must attain. These competencies are carefully aligned with the needs of Pakistan's healthcare system and the broader global context, ensuring that RMU graduates are not only skilled clinicians but also ethical leaders, compassionate caregivers, and innovative problem-solvers.

The RMU Undergraduate Competency Model emphasizes a holistic approach to medical education, integrating scientific knowledge with practical skills, critical thinking, and a deep commitment to lifelong learning. Each competency is complemented by specific sub competencies that provide a clear roadmap for students' development, guiding them from foundational knowledge to advanced clinical practice.

Through this competency-based framework, RMU aims to cultivate graduates who are capable of delivering high-quality, safe, and effective care, while also advancing the health and well-being of the communities they serve. By adhering to these competencies, RMU students will be equipped to excel in diverse medical environments, adapt to the rapidly changing landscape of healthcare, and contribute positively to the society they serve.

#### **Competency 1: Patient Care Deliverer**

The "Patient Care Deliverer" competency focuses on the practical aspects of delivering patient care. It emphasizes the importance of applying clinical skills, knowledge, and compassion in providing high-quality healthcare to patients. Students are expected to develop a strong foundation in patient-centered care, practice-based learning, and a commitment to continuous improvement in their clinical practice.

- **Practice-Based Learning:** Students should engage in continuous learning through practical experience, applying evidence-based medicine and reflecting on their clinical practice to improve patient care.
  - o Apply evidence-based medicine in clinical practice.
  - Reflect on clinical experiences to improve patient care.
  - o Engage in self-directed learning to enhance clinical skills.
- **Service Orientation:** A commitment to serving others is fundamental to the practice of medicine. Students should prioritize the well-being of patients and the community, demonstrating a strong dedication to providing compassionate and effective care.
  - o Demonstrate a commitment to patient-centered care.
  - Engage in community service activities.
  - o Reflect on the role of service in medical practice.

#### **Competency 2: Ethical & Professional**

The "Ethical & Professional" competency encompasses the foundational principles of medical ethics and professional behavior. It requires students to uphold the highest standards of legal and ethical responsibility in their practice. They must demonstrate empathy, integrity, and accountability, treating all individuals with respect and maintaining a commitment to continuous improvement.

- **Professional & Ethical & Legal Responsibility:** Students are expected to understand and apply ethical principles and legal requirements in medical practice. They should be able to identify and analyze ethical dilemmas in healthcare settings and make decisions that prioritize patient well-being.
  - Explain ethical frameworks in medical decision-making.
  - Apply legal standards in patient care.
  - Demonstrate professionalism in all interactions.
- Capacity for Improvement: Students should continuously strive to improve their clinical skills, knowledge, and patient care practices through self-assessment and reflective learning.
  - Assess personal strengths and weaknesses.
  - Implement strategies for self-improvement.
  - Seek feedback from peers and mentors.
- **Empathy:** Understanding and sharing the feelings of patients is crucial for building trust and providing compassionate care. Students must develop the ability to empathize with patients from diverse backgrounds.
  - o Demonstrate empathy in patient interactions.
  - Reflect on the emotional and psychological aspects of patient care.
  - Integrate empathy into clinical practice.
- Integrity: Students must practice medicine with honesty and adhere to moral and ethical principles, ensuring that their actions align with the values of the medical profession.
  - Maintain honesty in patient interactions.
  - Uphold ethical standards in clinical decision-making.
  - Demonstrate transparency in communication with patients and colleagues.
- Accountability: Medical students must be accountable for their actions, taking responsibility for their decisions and outcomes in patient care.

- o Take responsibility for clinical decisions.
- o Reflect on the outcomes of patient care.
- Ensure accountability in teamwork.
- **Respect:** Respect for patients, colleagues, and the broader healthcare team is fundamental. Students should treat everyone with dignity and consideration, regardless of differences in background or beliefs.
  - o Demonstrate respect in patient interactions.
  - o Collaborate respectfully with team members.
  - o Address cultural differences in a respectful manner.

#### Competency 3: Scholar & Life-Long Learner

The "Scholar & Life-Long Learner" competency highlights the importance of continuous learning and scholarly inquiry in medical practice. Students are encouraged to engage in scientific research, develop critical thinking skills, and commit to lifelong learning to stay current in their field and contribute to the advancement of medical knowledge.

- Living Systems: Students should have a deep understanding of living systems and their functions, enabling them to apply this knowledge to patient care.
  - o Explain the principles of living systems.
  - o Apply knowledge of living systems to clinical practice.
  - Evaluate the impact of living systems on health and disease.
- **Human Behavior:** Understanding human behavior is crucial for effective patient care and communication. Students should be able to analyze behavioral factors that influence health and apply this understanding in clinical settings.
  - o Analyze the impact of behavior on health outcomes.
  - o Apply behavioral principles in patient care.
  - o Reflect on the role of behavior in health and disease.
- **Diagnose and Manage:** Students must be proficient in diagnosing and managing medical conditions, using evidence-based approaches to ensure the best possible outcomes for patients.
  - o Diagnose medical conditions accurately.

- o Develop management plans for patient care.
- Evaluate the effectiveness of treatment interventions.
- Scientific Inquiry: Engaging in scientific inquiry is essential for advancing medical knowledge. Students should be able to conduct research, critically appraise evidence, and contribute to the scientific community.
  - o Conduct research on medical topics.
  - o Critically appraise scientific literature.
  - o Disseminate research findings effectively.
- Quantitative Reasoning: Quantitative reasoning skills are necessary for interpreting data and making informed decisions in medical practice. Students should be able to analyze and apply quantitative data in clinical settings.
  - o Interpret quantitative data in clinical practice.
  - o Apply statistical methods to medical research.
  - Reflect on the role of quantitative reasoning in decision-making.
- Critical Thinker: Developing critical thinking skills is vital for solving complex medical problems. Students should be able to analyze information, evaluate evidence, and make reasoned decisions in patient care.
  - o Analyze clinical scenarios critically.
  - o Evaluate evidence in medical practice.
  - Make informed decisions based on critical thinking.

#### **Competency 4: Team Worker & Communicator**

The "Team Worker & Communicator" competency emphasizes the importance of effective communication and teamwork in healthcare settings. Students are expected to develop strong oral and written communication skills, work collaboratively as part of a healthcare team, and demonstrate leadership when necessary. Reliability, adaptability, and resilience are key qualities that support their ability to function effectively in diverse and dynamic clinical environments.

• Oral and Written Communication: Students must be able to convey medical information clearly and effectively, both verbally and in writing, to patients, families, and colleagues.

- o Communicate medical information clearly.
- o Develop patient-centered communication strategies.
- Write accurate and comprehensive patient records.
- Team Member: Students should actively participate as members of the healthcare team, contributing to collective problem-solving and decision-making processes.
  - o Collaborate effectively with team members.
  - o Participate in interdisciplinary case discussions.
  - o Contribute to team-based patient care.
- **Team Leader:** When required, students should be able to take on leadership roles within the healthcare team, guiding and coordinating the efforts of others.
  - o Lead a healthcare team in clinical settings.
  - Make decisions as a team leader.
  - Facilitate effective team communication.
- Reliability and Dependability: Students must consistently demonstrate reliability and dependability in fulfilling their clinical responsibilities, ensuring that they are trusted members of the healthcare team.
  - Fulfill clinical duties reliably.
  - o Demonstrate dependability in patient care.
  - Maintain consistency in performance under pressure.
- Resilience & Adaptability: Students need to develop resilience to cope with the challenges of medical practice and adapt to changes in clinical settings.
  - Demonstrate resilience in stressful situations.
  - Adapt to changes in clinical practice.
  - Reflect on challenges and adapt strategies accordingly.

#### **Competency 5: Community Health Promoter**

The "Community Health Promoter" competency focuses on the role of medical students in promoting health within the community. It involves educating and empowering communities, conducting assessments, and engaging with diverse populations to address public health challenges. Cultural competence and advocacy are essential in promoting health equity and improving community health outcomes.

- **Health Education and Promotion:** Students should be able to design and implement health education programs that address the specific needs of the community.
  - Develop health education materials.
  - Implement community health promotion activities.
  - Evaluate the effectiveness of health education programs.
- Community Assessment and Engagement: Students must be capable of assessing the health needs of communities and engaging with community members to identify and address public health issues.
  - o Conduct community health assessments.
  - Engage with community stakeholders.
  - o Identify public health priorities based on community needs.
- Cultural Competence: Understanding and respecting cultural differences is crucial in providing effective community health promotion. Students should be able to work with diverse populations and tailor health interventions accordingly.
  - Demonstrate cultural sensitivity in community interactions.
  - o Adapt health interventions to cultural contexts.
  - o Reflect on cultural influences in health behaviors.
- Advocacy and Empowerment: Students should advocate for policies and practices that promote community health and empower individuals and communities to take control of their health.
  - Advocate for community health initiatives.
  - Empower individuals to make informed health decisions.
  - o Promote policies that address social determinants of health.

#### Competency 6: Quality & Safety Practitioner

The "Quality & Safety Practitioner" competency emphasizes the importance of patient safety and quality improvement in healthcare. Students are trained to understand and apply patient safety principles, comply with regulatory requirements, and collaborate with interdisciplinary teams to ensure the highest standards of care.

- Patient Safety Principles: Students must understand and apply patient safety principles to prevent medical errors and enhance the quality of care.
  - o Identify potential safety risks in clinical practice.
  - o Implement strategies to prevent medical errors.
  - Evaluate the effectiveness of patient safety interventions.
- **Regulatory Compliance:** Knowledge of and adherence to regulatory standards is essential in maintaining patient safety and quality care. Students must be familiar with relevant regulations and ensure compliance in their practice.
  - o Understand and apply healthcare regulations.
  - o Ensure compliance with legal and regulatory standards.
  - o Reflect on the impact of regulations on patient safety.
- **Interdisciplinary Collaboration:** Effective collaboration with professionals from various disciplines is necessary to achieve optimal patient outcomes. Students should develop skills in working within interdisciplinary teams to enhance patient care.
  - o Collaborate with interdisciplinary teams in patient care.
  - o Contribute to interdisciplinary case discussions.
  - o Reflect on the impact of interdisciplinary collaboration on patient outcomes.

#### Competency 7: Digital & Artificial Intelligence Literate

The "Digital & Artificial Intelligence Literate" competency prepares students to navigate the rapidly evolving landscape of digital health and artificial intelligence. Students are trained to use AI-based systems ethically and effectively in diagnosis and decision-making, ensuring that technological advancements are integrated into patient care responsibly.

- Technology and AI-Based Diagnosis and Decision-Based Systems: Students should be proficient in using technology and AI tools for diagnosis and decision-making, ensuring that these tools enhance patient care.
  - o Use AI-based tools for diagnosis.

- o Evaluate the effectiveness of technology in clinical decision-making.
- o Integrate digital tools into patient care responsibly.
- Ethical Usage of AI: Ethical considerations are paramount when using AI in healthcare. Students must understand the ethical implications of AI and ensure that its application respects patient rights and autonomy.
  - Identify ethical issues in AI usage.
  - o Apply ethical principles to AI-based decisions.
  - o Reflect on the impact of AI on patient care.

This framework ensures that undergraduate medical students at Rawalpindi Medical University are well-prepared to excel as competent, ethical, and compassionate healthcare professionals. By meeting these competencies and their corresponding learning objectives, students will be equipped to navigate the complexities of modern medical practice and contribute meaningfully to patient care and community health.

#### **Outcomes**

#### **Outcomes of the Undergraduate Integrated Modular Curriculum**

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the Health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of knowledge to help you attain personal and professional growth & excellence.



Structured Framework of Clinically Oriented Integrated Modular Curriculum 2024

# Structured Framework of Clinically Oriented Integrated Modular Curriculum 2024

Sr. No	Class	Module	Duration	Block
		Foundation Module	6 weeks	Block-I
		MSK-I Module	5 weeks	
		MSK-II Module	5 weeks	Block -II
1.	First Year MBBS	Blood & immunity Module	5 weeks	
		CVS Module	6 weeks	
		Respiration Module	5 weeks	Block -III
		General Education Cluster Module	1 week	
		Gastrointestinal tract Module	5 weeks	Block-IV
		Renal module	5 weeks	
2.	Second Year MBBS	Reproduction Module	4 weeks	Block -V
4.	Second Teal WIDDS	Central nervous system module	6 weeks	
		Special Senses Module	4 weeks	Block -VI
		Endocrinology Module	5 weeks	
		Foundation 1	4 weeks	Block- VII
		Foundation II	4 weeks	
3.	Third Year MBBS	GIT, Hepatobiliary & Parasitology	5 weeks	Block - VIII
3.	Tilliu Teal Widds	Microbes & Antimicrobials	7 weeks	
		Hematology, Immunology & Research	5 weeks	Block - IX
		CVS & Respiration	5 weeks	
		Otorhinolaryngology 1	2.5 weeks	Block- X
		Otorhinolaryngology II	3 weeks	
		Ophthalmology I	2.5 weeks	Block - XI
4.	Fourth Year MBBS	Ophthalmology II	3 weeks	
7.	rourdi real wibbs	Endocrinology	5 weeks	Block -XII
		Population Health & Reproduction	6 weeks	
		Renal	4 weeks	Block – XIII
		CNS & Psychiatry	6 weeks	
_		Medicine & Allied	12 weeks	Block- XIV
5.	Final Year MBBS	Surgery & Allied	12 weeks	Block- XV
		Gynae & Peads	12 weeks	Block- XVI

# First Year Academic Calendar 2024

Blocks					Block-	I						В	lock II					Block	III		ter			of Send Up al Examin	
	le	nt			MSK-I	(04 V	Veeks)				1	ıts		Blood mity N	& Module		nt	le	tt	t	Clust ile				
Module	Foundation Module	Module Assessment	I-XSM	Spring Vacation	I-XSM	Student Week	I-XSW	Module Assessment	Block Assessment	MSK - II	Summer Vacation	Module Assessments	Blood & Immunity Module	Module Assessment	Block Assessment	CVS	Module Assessment	Respiratory Module	Module Assessment	Block Assessment	General Education Cluster (GEC) Module	Prep leaves for send up	dn puəS	Prep Leaves for Professional Examination	Professional Examination
Duration in Weeks / Days	06 Weeks	03 Days	First Week	08 Days	First & Second Week	06 Days	Third- & Fourth Weeks	06 Days	03 Days	04 Weeks	2024	06 Days	04 Weeks	06 Days	03 Days	05 Weeks	06 Days	04 Weeks	06 Days	03 Days	06 Day	10 Days	13 Days	15 Days	20 Days
Dates	12th -Feb - 22nd March 2024	25th March – 27th March, 2024	1st April – 24th April 2024	05 <sup>th</sup> April – 13 <sup>th</sup> April 2024	25 <sup>th</sup> April – 27 <sup>th</sup> April 2024	29th April – 04th May 2024	05th May – 15th May 2024	16th May – 22nd May 2024	23rd May - 25th May 2024	27th May – 27th July 2024	17th June – 20th July 2	29th July – 03rd August 2024	05th August – 31st August 2024	02nd Sep - 07th Sep 2024	09th Sep – 11th Sep 2024	12th Sep – 10th Oct 2024	12th Oct – 18th Oct 2024	21st Oct – 16th Nov 2024	18th Oct – 23rd Nov 2024	25th Nov – 27th Nov 2024	28 <sup>th</sup> Nov – 04 Dec 2024	05th Dec – 14th Dec 2024	15th Dec – 27th Dec 2024	28th Dec 2024 – 11th Jan 2025	12th Jan 2024 —31st Jan 2025

<sup>\*</sup>Note: All dates are subject to change.

# Contact Hour Distribution for Core Subjects First Year MBBS

	Teaching Hours 1st Year MBBS						
Blocks	Modules	Anatomy	Physiology	Biochemistry	Total	Total Hours	Percentage
Foundation		86	111	56	253	469	39
Block-I	Block-I MSK-I		97	30	216		
D1 1 11	MSK-II	132	86	44	262	332	27
Block-II	Blood & Immunity	8	32	30	70		
D1 1 III	CVS	70	98	84	252	409	34
Block-III	Block-III Respiration		50	31	157		
Total Hours	Total Hours Per Subject		474	275	1210		100
Percentage	Percentage		39	23	100		

Discipline Wise Clinical Teaching Hours for First Year MBBS

Sr. No	Discipline	Contact Hours
1.	Behavioral sciences	05
2.	Community Medicine	09
3.	Pathology	13
4.	Pharmacology	08
5.	Medicine	13
6.	ENT	01
7.	DME	10
8.	Radiology	03
9.	Artificial Intelligence	01
10.	Family Medicine	03
11.	Gynae & Obs	01
12.	Quran translation	13
13.	Surgery	03
14.	Biomedical Ethics	05
15.	IUGRC	15
	Total Hours	103 Hours

# **Second Year Academic Calendar 2024**

Blocks					Block	-I						Bloc	kШ				Blo	ck II	Ι		Sched Profe	lule o	f Send Up al Examin	and ation
Module	GIT Module	Module Assessment	Spring Vacation	Renal	Rena	Student Week 9	Weeks)	Module Assessment	Block Assessment	Reproduction	Summer Vacation	Module Assessments	CNS Module	Module Assessment	Block Assessment	Special Senses	Module Assessment	Endocrinology	Module Assessment	Block Assessment	Prep leaves for send up	Send up	Prep Leaves for Professional Examination	Professional Examination
Duration in Weeks / Days	05 Weeks	03 Days	08 Days	First Week	Second Week	06 Days	Third & Fourth Weeks	06 Days	04 Days	04 Weeks	2024	06 Days	05 Weeks	06 Days	03 Days	03 Weeks	06 Days	04 Weeks	06 Days	04 Days	10 Days	13 Days	20 Days	24 Days
Dates All	26th -Feb - 30th March 2024	01** April – 03** April, 2024	05th April – 13th April 2024	18th April – 20th April 2024	22nd April – 27th April 2024	29th April – 04th May 2024	06 <sup>th</sup> May – 16 <sup>th</sup> May 2024	$17^{th} \text{ May} - 23^{rd} \text{ May } 2024$	24th May - 28th May 2024	29th May - 26th June 2024	17th June – 20th July 2024	22"d July – 27th July 2024	29th July - 31st August 2024	02"d Sep - 07th Sep 2024	09th Sep - 11th Sep 2024	12th Sep - 2rd Oct 2024	03rd Oct - 10th Oct 2024	11th Oct - 08th Nov 2024	09th Nov - 15th Nov 2024	$16^{th}$ Nov $-20^{th}$ Nov $2024$	21st Nov – 30th Nov 2024	01" Dec – 13 <sup>th</sup> Dec 2024	14th Dec 2024 – 01st Jan 2025	02**Jan 2025 – 25** Jan 2025

<sup>\*</sup>Note: All dates are subject to change.

# Contact Hour Distribution for Core Subjects Second Year MBBS

			Teaching Hours 2	nd Year MBBS			
Blocks	Modules	Anatomy	Physiology	Biochemistry	Total	Total Hours	Percentage
D1 1 IV	GIT		118	29	250	414	38
Block-IV	Renal	50	86	28	164		
D1 1 17	Reproduction	58	74	22	154	339	31
Block-V	CNS	45	113	27	185		
D1 1 7/1	Special Senses	74	24	55	153	333	
Block-VI	Endocrinology	74	30	76	180		
Total Hours	Total Hours Per Subject		404	445	237	1086	
Percentage	Percentage		37	41	22	100	

# Discipline Wise Clinical Teaching Hours for Second Year MBBS

Sr. No	Discipline	<b>Contact Hours</b>
1.	Psychiatry	1
2.	Community Medicine	10
3.	Medicine	15
4.	Bioethics	9
5.	Surgery	17
6.	Pathology	10
7.	Pharmacology	3
8.	Radiology	7
9.	Pediatrics	5
10.	Family Medicine	4
11.	Quran Translation	11
12.	Islamiyat	12
13.	Pak Studies	10
14.	Research Club activity	5
15.	Eye	4
16.	ENT	3
17.	Behavioral Sciences	3
18.	Gynae/Obstetrics	4
	Total Hours	103 Hours



# **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

**The Holy Quran Translation** 

**Biomedical Ethics & Professionalism** 

**Behavioral Sciences** 

**Family Medicine** 

**Artificial Intelligence (Innovation)** 

**Integrated Undergraduate Research** 

Curriculum (IUGRC)

**Entrepreneurship** 

**Digital Literacy Module** 

**Early Clinical Exposure (ECE)** 

#### **Introduction to Integrated University Spiral Courses/ General Education Cluster Module**

#### **Preamble**

In alignment with the Higher Education Commission's Undergraduate Policy 2023 and the Pakistan Medical and Dental Council's Guidelines 2024, This comprehensive module is designed to enrich the MBBS curriculum with a broad spectrum of interdisciplinary competencies.

The General Education Cluster encompasses essential domains—Leadership, Information Technology, Entrepreneurship, Expository Writing, Art and Humanities, Research, Bioethics, and Quran Translation—integrating these elements into a cohesive learning experience that extends across the five-year MBBS program.

This module is meticulously structured to enhance both professional and personal development, ensuring that medical graduates are not only adept in clinical skills but also well-rounded individuals equipped with a diverse skill set.

#### **Rationale for the General Education Cluster Module**

The General Education Cluster Module is conceived to address the multifaceted demands of modern medical education and practice. In accordance with the Higher Education Commission's Undergraduate Policy 2023 and the Pakistan Medical and Dental Council's Guidelines 2024, this module is designed to create a comprehensive educational framework that extends beyond traditional medical training.

he rationale behind this integrative approach includes:

- 1. Holistic Development: Medicine is a field that requires not only technical proficiency but also leadership, ethical judgment, and effective communication. By incorporating Leadership, Information Technology, Entrepreneurship, Expository Writing, Art and Humanities, Research and Bioethics, and Quran Translation into the curriculum, the module aims to develop well-rounded professionals who excel in both clinical and non-clinical aspects of healthcare.
- 2. Adaptation to Technological Advancements: The rapid advancement of technology and artificial intelligence is transforming healthcare. Proficiency in Information

  Technology and AI is crucial for modern medical practitioners to effectively use digital tools, engage in data-driven decision-making, and contribute to innovations in patient care and research.

- 3. Leadership and Management Skills: Effective leadership and management are essential for navigating the complexities of the healthcare environment. By focusing on leadership skills, the module prepares students to lead teams, manage healthcare systems, and address challenges with strategic vision and ethical integrity.
- 4. Entrepreneurial Mindset: Entrepreneurship fosters innovation and problem-solving. By integrating entrepreneurial principles into the curriculum, students are encouraged to think creatively, develop new healthcare solutions, and drive positive change in the industry.
- 5. Enhanced Communication Skills: Expository writing is a fundamental skill for clear and effective communication in medical practice. Mastery of this skill is vital for documenting patient care, conducting research, and engaging in academic discourse.
- 6. Cultural and Ethical Awareness: The inclusion of Art and Humanities helps students understand the broader human context of medicine, fostering empathy and cultural sensitivity. Concurrently, the continued study of Quran Translation and Islamiyat reinforces the integration of cultural and ethical perspectives with medical practice.
- 7. Strengthening Research and Bioethics: Advanced knowledge in research methodologies and bioethics ensures that students are well-prepared to conduct and evaluate research ethically, contributing to the advancement of medical science while adhering to high standards of ethical practice.
- 8. Preparation for a Dynamic Healthcare Environment: The General Education Cluster Module equips students with a diverse skill set necessary to thrive in a rapidly evolving healthcare landscape. It prepares them to be versatile, innovative, and ethical practitioners capable of addressing the multifaceted challenges they will encounter.

In essence, this module represents a strategic response to the evolving needs of the healthcare profession, ensuring that medical graduates are not only technically proficient but also capable of leading, innovating, and communicating effectively in a complex and dynamic field.

# Alignment of RMU Spiral Courses as per HEC Undergraduate Policy 2023 and guidelines of PMDC 2024

Title	Hours recommended by HEC/PMDC (to be covered from 1st to 4th year)	Teaching hours in RMUCurriculum
Quran Kareem	50 hours (PMDC)	55 Hours
Bioethics / Professionalism	25 Hours (PMDC)	50 Hours
Leadership	25 Hours (PMDC)	30 Hours
Islamic Studies	2 credit hours (HEC)	17 Hours
Ideology & Constitution of Pakistan/Pakistan Studies	2 credit hours (HEC)25 hours (PMDC)	17 Hours
Quantitative Reasoning/Research	2 credit hours (HEC)100 Hours (PMDC)	120 Hours
Entrepreneurship	2 credit hours (HEC)	50 Hours
Arts and Humanities (Videography)	2 credit hours (HEC)	20 Hours
Expository writing	2 credit hours (HEC)	16 Hours
Applications of information and communication technologies (ICT)	2 credit hours (HEC)25 Hours (PMDC)	25 Hours
Family medicine		30 Hours
Artificial intelligence		25 Hours
Behavioral Sciences	100 Hours (PMDC)	150 Hours

- 1 credit hour = 16 teaching hours
- The minimum requirement for the general education component is 30 credits in all the undergraduate/equivalent degree programs including associate degree. References: undergraduate-policy-2023-1pdf/261474627

#### **Islamiat & The Holy Quran Translation**

A course of Islamic Studies provides students with a comprehensive overview of the fundamental aspects of Islam, its history, beliefs, practices, and influence on society and familiarize students with a solid foundation in understanding the religion of Islam from an academic and cultural perspective. Ethics, in integrated form will shape the core of the course to foster among students the universal ethical values promoted by Islam





#### **Bioethics**

Biomedical ethics, also known as bioethics, is a field of study that addresses the ethical, social, and legal issues arising from medicine and the life sciences. It applies moral principles and decision-making frameworks to the practice of clinical medicine, biomedical research, and health policy. Biomedical ethics seeks to navigate the complex ethical dilemmas posed by advances in medical technology, research methodologies, and healthcare practices. Key areas of focus include patient rights and autonomy, confidentiality, informed consent, end-of-life care, resource allocation, and the ethics of genetic engineering, among others.

Biomedical ethics within medical universities plays a pivotal role in shaping the moral framework through which future healthcare professionals navigate the complex and often challenging decisions they will face in their careers. This critical discipline integrates ethical theories and principles with clinical practice, research, and healthcare policy, fostering a deep understanding of the ethical dimensions of medicine. By embedding biomedical ethics into the curriculum, Rawalpindi medical university equips students with the tools to critically analyze and address ethical dilemmas, ranging from patient confidentiality and informed consent to end-of-life care and the equitable distribution of healthcare resources.

This education goes beyond theoretical knowledge, encouraging students to apply ethical reasoning in practical scenarios, thus preparing them for the moral complexities of the medical field. Biomedical ethics also promotes a culture of empathy, respect, and integrity, ensuring that future medical practitioners not only excel in their technical skills but also uphold the highest ethical standards in patient care and research. Through seminars, case studies, and interdisciplinary collaborations, students are encouraged to engage in ethical discourse, reflecting on the societal impact of medical advancements and the responsibility of medical professionals to society. This foundational aspect of medical education cultivates a generation of healthcare professionals committed to ethical excellence, patient advocacy, and the pursuit of equitable healthcare for all.



#### Leadership & Professionalism

Professionalism in medicine refers to the set of values, behaviors, and relationships that underpin the trust the public has in doctors and other healthcare professionals. It encompasses a commitment to competence, integrity, ethical conduct, accountability, and putting the interests of patients above one's own. Professionalism involves adhering to high standards of practice, including maintaining patient confidentiality, communicating effectively and respectfully with patients and colleagues, and continually engaging in self-improvement and professional development. It also includes a responsibility to improve access to high-quality healthcare and to contribute to the welfare of the community and the betterment of public health. In essence, professionalism in medicine is foundational to the quality of care provided to patients and is critical for maintaining the trust that is essential for the doctor-patient relationship.

Rawalpindi Medical University emphasizes the importance of professionalism in medicine, integrating it throughout its curriculum to ensure that students embody the core values of respect, accountability, and compassion in their interactions with patients, colleagues, and the community. This focus on professionalism is designed to prepare students for the complexities of the healthcare environment, instilling in them a deep sense of responsibility to their patients, adherence to ethical principles, and a commitment to continuous learning and improvement. Through a combination of theoretical learning, practical training, and mentorship, RMU encourages its students to exemplify professionalism in every aspect of their medical practice. Workshops, seminars, and clinical rotations further reinforce these values, providing students with real-world experiences that highlight the importance of maintaining professional conduct in challenging situations. RMU's approach to professionalism not only shapes competent and ethical medical professionals but also contributes to the broader mission of improving healthcare standards and patient outcomes. By prioritizing professionalism, Rawalpindi Medical University plays a crucial role in advancing the medical profession and ensuring that its graduates are well-equipped to meet the demands of a rapidly evolving healthcare landscape with honor and integrity.



#### **Communication Skills**

Communication skill for health professionals involves the ability to effectively convey and receive information, thoughts, and feelings with patients, their families, and other healthcare professionals. It encompasses a range of competencies including active listening, clear and compassionate verbal and non-verbal expression, empathy, the ability to explain medical conditions and treatments in an understandable way, and the skill to negotiate and resolve conflicts. Effective communication is essential for establishing trust, ensuring patient understanding and compliance with treatment plans, making informed decisions, and providing holistic care. It directly impacts patient satisfaction, health outcomes, and the overall efficiency of healthcare delivery

At Rawalpindi Medical University (RMU), the development of communication skills is regarded as a fundamental aspect of medical education, recognizing its critical importance in enhancing patient care, teamwork, and interdisciplinary collaboration. RMU is dedicated to equipping its students with exceptional communication abilities, enabling them to effectively interact with patients, their families, and healthcare colleagues. The curriculum is thoughtfully designed to incorporate various interactive and experiential learning opportunities, such as role-playing, patient interviews, and group discussions, which allow students to practice and refine their communication skills in a supportive environment.

By integrating communication skills training throughout its programs, RMU not only enhances the interpersonal competencies of its future healthcare professionals but also contributes to improving the overall quality of healthcare delivery. Graduates from RMU are distinguished not just by their clinical expertise but also by their ability to connect with patients and colleagues, making them highly effective and compassionate practitioners.

#### **Behavioral Sciences**

Behavioral sciences in medicine focus on understanding and addressing the psychological and social aspects of health and illness. This interdisciplinary field combines insights from psychology, sociology, anthropology, and other disciplines to enhance medical care and patient outcomes. It explores how behavior, emotions, and social factors influence health, disease, and medical treatment. By incorporating behavioral science principles into medical practice, healthcare professionals can better understand patients' perspectives, improve communication, and promote positive health behaviors, ultimately contributing to more comprehensive and effective patient care.

MO	DOLAR CORR		Institute of Psychiate  Benazir Bhutto Hospi	•	TEAR MBBS
Year	LGIS	SDL	CLINICAL ROTA	ATION	Total
1 <sup>st</sup> Year	12 hours	20 hours	No clinical rotation	n	32 hours
2 <sup>nd</sup> Year	8 hours	20 hours	No clinical rotation	1	28 hours
3 <sup>rd</sup> Year	12 hours	30 hours	20 hours 8am-10:30am 4 days a week, 2 weeks rotation	28 hours 2pm -6pm 7 days in 2 weeks rotation	90 hours
Total					150 hours

#### **Family Medicine**

Family medicine is a medical specialty dedicated to providing comprehensive health care for people of all ages and genders. It is characterized by a long-term, patient-centered approach, building sustained relationships with patients and offering continuous care across all stages of life. It focuses on treating the whole person within the context of the family and the community, emphasizing preventive care, disease management, and health promotion.

The Family Medicine Curriculum at Rawalpindi Medical University (RMU) marks a significant stride towards holistic healthcare education, aiming to prepare medical graduates for the comprehensive and evolving needs of family practice. This curriculum is designed to offer a broad perspective on healthcare, focusing on preventive care, chronic disease management, community health, and the treatment of acute conditions across all ages, genders, and diseases. Emphasizing a patient-centered approach, the curriculum ensures that students develop a deep understanding of the importance of continuity of care, patient advocacy, and the ability to work within diverse community settings.

RMU's Family Medicine Curriculum integrates theoretical knowledge with practical experience. Students are exposed to a variety of learning environments, including community health centers, outpatient clinics, and inpatient settings, providing them with a well-rounded understanding of the different facets of family medicine. This hands-on approach is complemented by interactive sessions, workshops, and seminars that cover a wide range of topics from behavioral health to geriatric care, ensuring students are well-equipped to address the comprehensive health needs of individuals and families.

# Artificial Intelligence

To realize the dreams and impact of AI requires autonomous systems that learn to make good decisions. Reinforcement learning is one powerful paradigm for doing so, and it is relevant to an enormous range of tasks, including robotics, game playing, consumer modeling and healthcare. This class will provide a solid introduction to the field of reinforcement learning and students will learn about the core challenges and approaches, including generalization and exploration. Through a combination of lectures, and written and coding assignments, students will become well versed in key ideas and techniques for RL. Assignments will include the basics of reinforcement learning as well as deep reinforcement learning — an extremely promising new area that combines deep learning techniques with reinforcement learning. In addition, students will advance their understanding and the field of RL through a final project.



#### **Family Medicine**

Undergraduate /Curriculum for MBBS



Prof. Muhammad Uma Vice Chancellor Rawalpindi Medical Univers

Dr. Sadia Azam Khan HOD Family Medicine Rawalpindi Medical Univer



#### **Integrated Undergraduate Research Curriculum**

The integrated undergraduate research curriculum (IUGRC) of RMU occupies a definite space in schedule of each of the five years in rational and incremental way. It has horizontal harmonization as well as multidisciplinary research work potentials. In the first-year teachings are more introductory & inspirational rather than instructional. The teachings explain what & why of research and what capacities are minimally required to comprehend research & undertake research. Some research dignitaries' lecture are specifically arranged for sharing their experiences and inspiring the students. Students are specifically assessed through their individual compulsory written feedback (reflection) after the scheduled teachings end.

# Rawalpindi Medical University Rawalpindi Rawalpindi TRUTH TRUTH TRUTH MEDICAL SERVICE Integrated Undergraduate Research Curriculum (IUGRC)

#### **Innovation & Entrepreneurship**

Entrepreneurship is the process of designing, launching, and running a new business, which typically starts as a small enterprise offering a product, process, or service for sale or hire. It involves identifying a market opportunity, gathering resources, developing a business plan, and managing the business's operations, growth, and development. Entrepreneurship in medical universities represents a burgeoning field where the innovative spirit intersects with healthcare to forge advancements that can transform patient care, medical education, and healthcare delivery. This unique amalgamation of medical expertise and entrepreneurial acumen empowers students, faculty, and alumni to develop groundbreaking medical technologies, healthcare solutions, and startups that address critical challenges in the health sector. By integrating entrepreneurship into the curriculum, Rawalpindi Medical university is not only expanding the traditional scope of medical education but also fostering a culture of innovation and problem-solving. This enables future healthcare professionals to not only excel in clinical skills but also in business strategies, leadership, and innovation management.

Such initiatives often lead to the creation of medical devices, digital health platforms, and therapeutic solutions that can significantly improve patient outcomes and make healthcare more accessible and efficient. Through incubators, accelerators, and partnerships with the industry, medical universities are becoming hotbeds for healthcare innovation, driving economic growth, and contributing to the broader ecosystem of medical research and entrepreneurial success.



#### RAWALPINDI MEDICAL UNIVERSITY OFFICE OF RESEARCH INNOVATION & COMMERCIALIZATION (ORIC)

Ph: +92-51-9290853

Vice Chancellor Rawalpindi Medical University Rawalpindi

#### Subject:

#### INNOVATION & ENTERPRENEURSHIP FOR UNDERGRADUATE CURRICULUM

This initiative seeks to embed a dynamic Innovation and Entrepreneurship module within the undergraduate curriculum. Focused on nurturing a culture of creativity and strategic thinking, the program will empower students with essential skills for today's rapidly evolving business landscape. Emphasizing hands-on experiences, the module will guide students through ideation, prototyping, and business model development. By fostering an entrepreneurial mindset, we aim to equip undergraduates with the tools to identify opportunities, solve real-world problems, and instigate positive change. This transformative addition ensures graduates are not only gob-ready but also capable of driving innovation and contributing meaningfully to the global entrepreneurial ecosystem.

I am thankful to Prof Iftikhar Hanif and all Seniors who are supporting this idea

Dr Asif Maqsood Butt Manager I&C

#### **Digital Literacy Module**

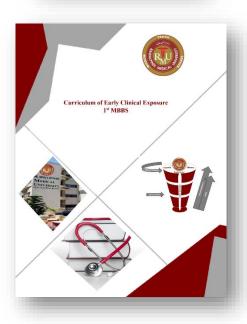
Digital literacy means having the skills one needs to live, learn, and work in a society where communication and access to information is increasingly through digital technologies like internet platforms, social media, and mobile devices.

#### **Early Clinical Exposure (ECE)**

Early clinical exposure helps students understand the relevance of their preclinical studies by providing real-world contexts. This can enhance motivation and engagement by showing students the practical application of their theoretical knowledge. Early exposure allows students to begin developing essential clinical skills from the start of their education. This includes not only technical skills but also crucial soft skills such as communication, empathy, and professionalism. Direct interaction with patients early in their education helps students appreciate the complexities of patient care, including the psychological and social aspects of illness. Early exposure to various specialties can aid students in making informed decisions about their future career paths within medicine.

Early clinical experiences contribute to the development of a professional identity, helping students see themselves as future physicians and understand the responsibilities and ethics associated with the profession. This can help reduce the anxiety associated with clinical work by familiarizing students with the clinical environment. It can build confidence in their abilities to interact with patients and healthcare professionals. Engaging with real-life clinical situations early on encourages the development of critical thinking and problem-solving skills, which are essential for medical practice. It helps bridge the gap between theoretical knowledge and practical application, leading to a more integrated and holistic approach to medical education. It allows students to observe and understand how healthcare systems operate, including the challenges and limitations faced in different settings.: Early patient interaction emphasizes the importance of patient-centered care from the outset, underscoring the importance of treating patients as individuals with unique needs and backgrounds. Practical experiences can enhance long-term retention of



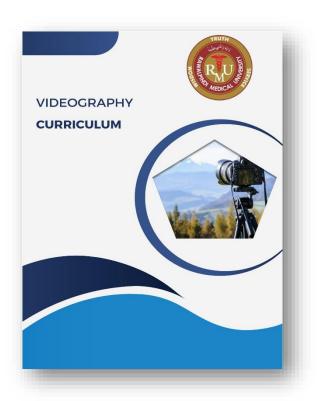


knowledge as students are able to connect theoretical learning with clinical experiences.: Early clinical experiences often involve working in multidisciplinary teams, which fosters a sense of collaboration and understanding of different roles within healthcare.

In summary, early clinical exposure in medical education is pivotal for the holistic development of medical students, providing them with a strong foundation of practical skills, professional attitudes, and a deep understanding of patient-centered care.

#### **Videography Curriculum**

In an age where visual communication and digital media play pivotal roles in healthcare education, research dissemination, and public outreach, the importance of videography as a skill cannot be overstated. This comprehensive course at Rawalpindi Medical University is designed to equip students with the essential knowledge, technical proficiency, and creative acumen necessary to excel in utilizing video as a powerful tool in the medical field. Spanning four years and totaling 24 hours of instruction, this course integrates theoretical foundations with hands-on practical experience tailored to the unique needs of future healthcare professionals. Through interactive lectures, immersive workshops, and project-based assessments, students will embark on a transformative journey from mastering fundamental camera operations and lighting techniques to refining advanced video editing skills and project management capabilities.





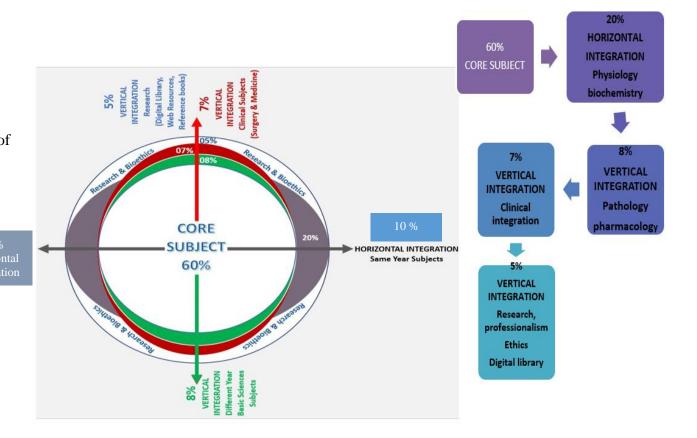
# **Teaching and Learning Methodologies / Strategies**

- Large Group Interactive Session (LGIS)
- Small Group Discussion (SGD)
- Self-Directed Learning (SDL)
- Case Based Learning (CBL)
- Problem- Based Learning (PBL)
- Skill Labs/Practicals (SKL)

#### **Teaching and Learning Methodologies / Strategies**

#### **Large Group Interactive Session (LGIS)**

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will the followed for delivery of all LGIS. The lecturer will introduce a topic or common clinical condition and explains the underlying phenomena through questions, pictures, videos of patients, interviews, and exercises, etc. Students are actively involved in the learning process.



**Prof Umar's Model of Integrated Lecture** 

#### **Small Group Discussion (SGD)**

This format helps students to clarify concepts acquire skills and attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics or power point presentations. Students exchange opinions and apply knowledge gained from lectures, SGDs and self-study. The facilitator role is to ask probing questions, summarize and help to clarify the concepts

**Table 2. Standardization of teaching content in Small Group Discussions** 

S. No	Topics	Approximate %
1	Title Of SGD	
2	Learning Objectives from Study Guides	
3	Horizontal Integration	5%+5%=10%
4	Core Concepts of the topic	60%
5	Vertical Integration	20%
6	Related Advance Research points	3%
7	Related Ethical points	2%

**Table 3. Steps of Implementation of Small Group Discussions** 

Step 1	Sharing of Learning objectives by using students Study guides	First 5 minutes
Step 2	Asking students pre-planned questions from previous teaching session to develop co-relation (these questions will be standardized)	5minutes
Step 3	Students divided into groups of three and allocation of learning objectives	5minutes
Step 4	ACTIVITY: Students will discuss the learning objectives among themselves	15 minutes
Step 5	Each group of students will present its learning objectives	20 min
Step 6	Discussion of learning content in the main group	30min
Step 7	Clarification of concept by the facilitator by asking structured questions from learning content	15 min
Step 8	Questions on core concepts, horizontal integration, vertical integration, related research article, related ethics content	
Step 9	Students Assessment on online MS teams (5 MCQs)	5 min
Step 10	Summarization of main points by the facilitator	5 min
Step 11	Students feedback on the SGD and entry into log book	5 min
Step 12	Ending remarks	

#### **Self-Directed Learning (SDL)**

- Self- directed learning is a process where students take primary charge of planning, continuing, and evaluating their learning experiences.
- Time Home assignment
- Learning objectives will be defined
- Learning resources will be given to students = Textbook (page no), web
   site
- Assessment:

i Will be online on LMS (Mid module/ end of Module)

ii.OSPE station

#### PBL (SDL)

 Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.

The 7- Jum	p-Format of PBL (Maastricht Medical School)							
Step 7	Synthesize & Report							
Step 6	Collect Information from outside							
Step 5	Step 5 Generate learning Issues							
Step 4	Step 4 Discuss and Organize Ideas							
Step 3	Brainstorming to Identify Explanations							
Step 2	Define the Problem							
Step 1	Step 1 Clarify the Terms and Concepts of the Problem Scenario							
	Problem- Scenario							

#### **Case Based Learning (CBL)**

- It's a learner centered model which engages students in discussion of specific scenarios that typically resemble real world examples.
- Case scenario will be given to the students
- Will engage students in discussion of specific scenarios that resemble or typically are real-world examples.
- Learning objectives will be given to the students and will be based on
  - i. To provide students with a relevant opportunity to see theory in practice
  - ii. Require students to analyze data in order to reach a conclusion.
  - iii. Develop analytic, communicative, and collaborative skills along with content knowledge.

#### Practical Sessions/Skill Lab (SKL)

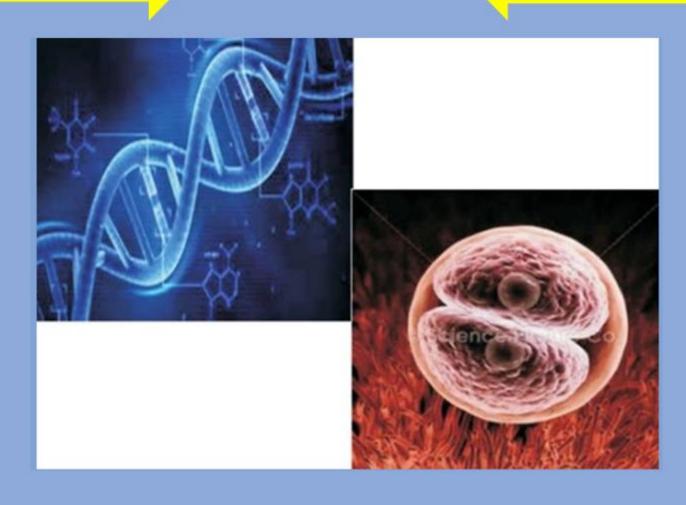
Demonstration/ power point presentation 4-5 slide	10-15 minutes
Practical work	25-30 minutes
Write/ draw and get it checked by teacher	20-25 minutes
05 mcqs at the end of the practical	10 minutes
At the end of module practical copy will be signed by head of	
department	
At the end of block the practical copy will be signed by	
Head of Department, Dean, Medical education department, QEC	



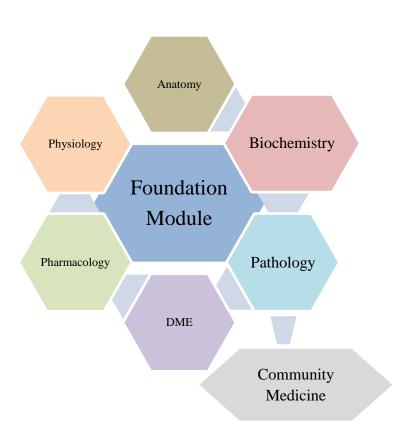




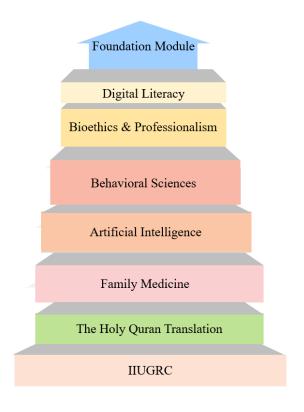
# **Foundation Module**



### **Integration of Disciplines in Foundation Module**



### **Spiral / General Education Cluster Courses**



## **Discipline Wise Details of Modular Content**

Block	Module	General	Embryology	Histology	Gross Anatomy
		Anatomy			
I	• Anatomy	Introduction to General Anatomy	General Embryology  Introduction to Human Development  Oogenesis  Spermatogenesis  Female Reproductive Cycles  Ovulation and Fertilization  Cleavage and Blastocyst Formation  Development of Mammary Gland	General Histology  Types of Epithelium  Specialization of Apical Cell Surface  Intercellular Junctions and Adhesions  Glandular Epithelium  Mammary Gland	<ul> <li>Anatomicomedical Terminologies I (position &amp; planes)</li> <li>Anatomicomedical Terminologies II (Anatomical Terms and Axis of Movements)</li> <li>Anatomicomedical Terminologies III (Cell and Tissues)</li> <li>Anatomicomedical Terminologies IV (Skin &amp; Body Systems)</li> <li>Clavicle</li> <li>Scapula</li> <li>Humerus</li> <li>Anterior Axioappendicular Muscles</li> <li>Posterior Axioappendicular Muscles</li> <li>Axilla</li> <li>Brachial Plexus</li> <li>Brachial Plexus Injuries</li> <li>Breast</li> <li>Sternoclavicular and Acromiclavicular Joints</li> <li>Radiograph and Surface Anatomy of Axioappendicular Region</li> </ul>
	Biochemistry	• Cell and Cell On Chemistry, Gen		Across Cell Membrane, Physi	cochemical Properties, Enzymes, Cancer, Nucleic Acid
	<ul> <li>Physiology</li> </ul>	<ul><li> The Cell and Its</li><li> Genetic Control</li></ul>	enization of The Human Body and Control Functions of Protein Synthesis, Cell Function, And Obstances Through the Cell Membrane		t
Orientation Sessions					
	Opening Ceremony     Introduction to Dis	(DME)			

- Introduction to Integrated Modular Curriculum, Study Guide sand RMU Policies
- Assessment Model of RMU & Continuous Internal Assessment
- Research Model of RMU (IUGRC), Biomedical Ethics Family Medicine, Artificial Intelligence
- Introduction to Different Teaching Strategies, Role of Team Leader Facilitator and Students SGD/LGIS/TBL/PAL/INTERNET & Literature Group activity (DME)
- Orientation to Integrated Modular System for Pre-clinical Years (DME)
- Lecture on Feedback (DME)
- Mission and Vision (DME)
- Introduction to Pharmacology
- Introduction to Pathology
- Introduction to Community Medicine (Community Medicine)

Clinically content relevant to Foundation module Routs of drug administration (Pharmacology)

Factors affecting drug absorption (Pharmacology)

Absorption of drugs (Pharmacology)

• Introduction to Medicine (Medicine)

	Spiral Courses
The Holy Quran	The Holy Quran Translation Component
Translation	Islam And Medical Science
	Introduction to Quran Translation
• Bioethics &	Introduction to history of medical ethics
Professionalism	Leadership Professionalism (DME)
Artificial Intelligence	Introduction to Artificial Intelligence
Family Medicine	Introduction to Family Medicine & its application in health care system
	Research I Introduction of health research process
<ul> <li>Integrated Under</li> </ul>	Research II characteristic of reserch process
Graduate Research	Research III Basis of ethics in health research
Innovation	Research IV Basics of ethics in medical reserch
(IUGRC)	
<ul> <li>Behavioral Sciences</li> </ul>	Introduction to Behavioral Sciences
	Management of stress
<ul> <li>Digital Literacy</li> </ul>	How to use Higher Education Commission (HEC) digital libaray.
Module	
	Vertical Integration

Distribution of drug	gs (Pharmacology)					
	Cellular response to injury (Pathology)					
-	ulations (Pathology)					
Pigments (Patholog						
	active oxygen species (Pathology)					
	ury/apoptosis (Pathology)					
Genetic disorders (						
History of medicine						
_	d subjects (Medicine)					
Chromosomal abre						
History taking and	general physical examination (Medicine)					
	Early Clinical Exposure (ECE)					
Clinical Rotations	Rotation of students to					
	Medicine & Allied					
	Surgery and Trauma					
	Emergency Department					
	Hands on Workshop on Basic Life Support (BLS)					
Hands on Worksho	ps on BLS					
	Clinical Themes					
Medical Ethics						
Genetic Disorders						

#### **Foundation Module Team**

Module Name : Foundation Module

Duration of module : 06 Weeks

12. Focal Person Pathology

Lectures

13. Focal Person Behavioral Sciences

15. Focal Person Quran Translation

16. Focal Person Family Medicine

Focal Person Community Medicine

Coordinator:Dr. Zenera SaqibCo-coordinator:Dr. Qurat Ul AinReviewed by:Module Committee

Dr. Asiya Niazi

Dr. Saadia Yasir

Dr. Afifa Kulsoom

Dr. Fahad Anwar

Dr. Sadia Khan

	Module Comm	ittee		Modu	le Task Force Team
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Zenera Saqib (Demonstrator of Anatomy)
2.	Director DME	Prof. Dr. Rai Muhammad	2.	DME Focal Person	Dr. Sidra Hamid
		Asghar			
3.	Convener Curriculum	Prof. Dr. Naeem Akhter	3.	Co-coordinator	Dr. Qurat Ul Ain (Senior Demonstrator of Anatomy)
4.	Chairperson Anatomy & Dean Basic	Prof. Dr. Ayesha Yousaf	4.	Co-Coordinator	Dr. Uzma Kiyani (Senior Demonstrator of Physiology)
	Sciences				
5.	Additional Director DME	Prof. Dr. Ifra Saeed	5.	Co-coordinator	Dr. Nayab Ramzan (Senior Demonstrator of
					Biochemistry)
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar			
7.	Chairperson Biochemistry	Dr. Aneela Jamil	DME Implementation Team		
			1.	Director DME	Prof. Dr. Rai Muhammad Asghar
8.	Focal Person Anatomy First Year	Asso. Prof. Dr. Mohtashim	2.	Implementation Incharge 1st & 2 <sup>nd</sup>	Prof. Dr. Ifra Saeed
	MBBS	Hina		Year MBBS & Add. Director DME	
9.	Focal Person Physiology	Dr. Sidra Hamid	3.	Assitant Director DME	Dr. Sidra Hamid
10.	Focal Person Biochemistry	Dr. Aneela Jamil	4.	Editor	Muhammad Arslan Aslam
11.	Focal Person Pharmacology	Dr. Zunera Hakim			

#### **Module I - Foundation Module**

**Introduction:** In the Foundation Module students will develop understanding of the basic concepts of cell Physiology, Biochemistry, Anatomy, Pathology, Pharmacology, Community medicine and study skills through an integrated course.

**Rationale:** The foundation module is designed to impart basic knowledge about the normal structure, organization, functions and development of human body. This knowledge will serve as a base on which the student will construct further knowledge about the etiology, pathogenesis and prevention of diseases; the principles of their therapeutics and management.

#### **Module Outcomes**

Each student will be able to:

#### Knowledge

- Acquire the basic science knowledge and terminology necessary to understand the development and functioning of normal structures of human body starting from biochemical level to organ system level, as well as the concepts of diseases in the community and drug dynamics.

  Use technology based medical education including
- Artifical Intelligence.

Appreciate concepts & importance of:

- Family Medicine
- Biomedical Ethics
- Research.
- Enterpeneurship

#### **Skills**

- Identify different anatomical planes and correlate the importance of these with clinical medicine.
- Identify various apparatus used in lab.
- Preparation and identification of microscopic slides.
- Preparation of solutions of various strengths.
- Basic Life Support (BLS)
- Early Clinical Exposure (ECE)

#### **Attitude**

• Demonstrate professional attitude, team-building spirit and good communication skills.

This module will run in 6 weeks' duration. The content will be covered through introduction of topics. Instructional strategies are given in the timetable and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

#### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

- Introduction to RMU and Disciplines
- Medical Education and Integrated Disciplines
- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



## **Orientation Week**

# **Introduction to RMU and Disciplines**

		Medical Education and Integrated Disciplines		
Topic	Facilitator	Learning Objectives	Teaching Strategy	Assessment Tool
Introduction to RMU and Allied Hospitals	Vice Chancellor	Honorable VC will welcome and introduce the University and Allied Hospitals.	LGIS	MCQS
•	1	The students will be able to:	•	1
		Introduce DME		
		Define Medical Education		MCQS
Introduction to Medical	Assistant Director	Discuss its role		
Education Department Introduction to Integrated	DME	Describe CME	I CIG	
Modular System and	DIVIL	Appreciate role of DME in their curriculum	LGIS	
Foundation Module		Appreciate role of DME in attendance monitoring		
		Illustrate the application		
		Leave submission process		
		Outline the RMU Curriculum structural organization, (integrated modular		
		system)		
		Describe Learning resources used in study guides		
		Define Anatomy		
		Define Physiology	1 010	1.600
Introduction to Basic	Lecture by HODs	Define Biochemistry	LGIS	MCQS
Sciences	Lecture by HODs	Define Pathology		
Belences		Define Community Medicine		
		Define Forensic Medicine		
		Define Pharmacology		
		Define medicine		
Introduction to		Discuss History of medicine		
Medicine & Allied		Describe Islamic concepts of medicine	LGIS	MCQS

		Identify Basic sciences involved in medicine		
	Lecture by Dean	Identify Clinical subjects and their role		
	of Medicine & Allied	Describe practice of medicine		
Introduction to Teaching		Differentiate between various Teaching & Learning strategies		
And Learning Strategies	Basic Science	Describe the process		
With Emphasis On SGD/LGIS/TBL (Team	Team & DME	Enlist different roles of students and facilitator in mentioned teaching sessions	LGIS	MCQS
base learning)/PAL (Peer				
Assisted learning)/Internet & Literature Search				
Introduction To Use Of		Recall precautionary measures mandatory during practical sessions and skill lab		
Laboratory Facilities /	Team members	Recall safety measures during blood handling		
Equipment And Safety	(Biochemistry	Demonstrate use of various glass ware	LGIS	MCQS
Measures (Biochemistry and Pathology)	and Pathology)	Demonstrate use of lab instruments		
		Define study skills or study strategies (how to study?)		
Study Skills-I	Behaviour	Describe the:		
(Medical Educationist and	Science and DME	Methods based on memorization such as rehearsal and rote learning	LGIS	OSPE
Behavioral Sciences)	team member	Methods to retain the content in long term memory		
		Methods based on communication skills e.g., reading and listening		
		Principles of TBL & PAL		
		Describe the:		
	Behaviour Science and DME	Methods based on condensing information, summarizing and the use of keywords	LGIS	MCQS
Study Skills-II	team member	Methods based on visual imagery		
		Methods based on acronyms and pneumonics		
		Methods based on time management, organization and lifestyle changes		
Islam and Medical Science	Mufti Naeem sab	Discuss role of Islam and importance of Islam in Medical Science	LGIS	MCQS

## **Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)**

### **Anatomy Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of One Hour The Lecture The Student Should Be Able To	Domain	Strategy	Tool
	<ul> <li>Define the term Anatomy and its various branches</li> </ul>	C1		
	Define different terminologies related to Anatomy	C1		
	• Describe different Anatomical planes and directions in relation to anatomical position	C2		G 4 G
	Elaborate different phases in life span of man	C2	LCIC	SAQ
	Define basic tissues of human body	C1	LGIS	MCQ VIVA
	<ul> <li>Discuss general outlines and functions of basic tissues</li> </ul>	C2		VIVA
Introduction to General	<ul> <li>Describe formation of different systems of body</li> </ul>	C2		
Anatomy	Understand the curative and preventive health care measures.	C3		
	Practice the principles of bioethics	C3		
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Read relevant research article	C3		
	Use HEC digital library	C3		
	Embryology	·		
	<ul> <li>Discuss significance and importance of studying Embryology.</li> </ul>	C2		
	<ul> <li>Define different terminologies to describe developmental stages.</li> </ul>	C1		
	• Describe series of critical events that take place during embryonic development.	C2		
	<ul> <li>Appreciate difference between embryonic and fetal period.</li> </ul>	C2		0.4.2
Introduction to Human	<ul> <li>Discuss common chromosomal abnormalities.</li> </ul>	C2	LGIS	SAQ
Development	<ul> <li>Understand the curative and preventive health care measures.</li> </ul>	C3	LGIS	MCQ VIVA
	<ul> <li>Apply the strategic use of artificial intelligence in healthcare.</li> </ul>	C3		VIVA
	<ul> <li>Practice principles of bioethics</li> </ul>	C3		
	Use HEC digital library.	C3		
	Read relevant research article.	C3		
	Discuss role of female hormones during oogenesis	C2		
Oogenesis	<ul> <li>Describe different stages of oogenesis</li> </ul>	C2		

	Correlate clinical aspects of gametogenesis	C3	LGIS	SAQ
	To understand the bio-physiological aspects of gametogenesis	C2		MCQ
	Understand the curative and preventive health care measures.	C3		VIVA
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Practice the principles of bioethics	C3		
	Use HEC digital library	C3		
	Read a relevant research article	C3		
	Define spermatogenesis.	C1		
	Describe different phases of spermatogenesis	C2		
	Discuss stages of spermiogenesis	C2		SAQ
Spermatogenesis	Elaborate functions of male hormones during spermatogenesis	C2	LGIS	MCQ
	Understand the curative and preventive health care measures.	C3		VIVA
	Practice the principles of bioethics	C3		
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Able to read a relevant research article	C3		
	Use HEC digital library	C3		
	Understand Ovarian and Uterine cycle	C1		
	Correlate Ovarian and Uterine cycles	C3		
	Describe different phases of Ovarian and Uterine cycles	C2		
	Enumerate female sex hormones	C1	I CIC	SAQ
Female Reproductive	Discuss functional significance of female reproductive hormones in reproductive cycles	C2	LGIS	MCQ
Cycles	Discuss the anovulatory cycle in female	C3		VIVA
Cycles	Understand the bio-physiological aspects female reproductive cycle	C2		
	Focus on provision of curative and preventive health care services	C3		
	Read a relevant research article	C3		
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Use HEC digital library	C3		
	Describe follicular development, ovulation and subsequent events in ovary	C2		
	Give an account on role of leutinizing hormone in ovulation	C1	]	
Ovulation and	Discuss capacitation in female genital tract	C2	] _ [	SAQ
Fertilization	Describe different phases and results of fertilization	C2	LGIS	MCQ
	Enlist causes of infertility.	C1	]	VIVA
	Enlist different technologies of assisted fertilization	C1	]	· · · -

	Discuss different techniques of assisted reproduction with special emphasis on IVF	C3		
	Discuss the bio-physiological aspects of ovulation and fertilization	C2	]	
	• Focus on provision of curative and preventive health care services.	C3		
	Practice principles of bioethics	C3	]	
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Understand the curative and preventive health care measures.	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3	]	
	Define cleavage	C1		
	Define compaction	C1	]	
	Describe blastocyst formation	C2	]	SAQ
Cleavage and	Understand the bio-physiological aspects of cleavage and blastocyst	C2	LGIS	MCQ
Formation of	Correlate clinical condition of cleavage and blastocyst formation	C3	]	VIVA
Blastocyst	Apply the strategic use of artificial intelligence in healthcare	C3	]	
Biastocyst	Understand the curative and preventive health care measures.	C3	]	
	Practice principles of bioethics	C3	]	
	Read a relevant research article	C3	]	
	Use HEC digital library	C3	]	
	Describe the Sources of development of mammary gland .	C2		
	Discuss different stages of activity of mammary gland.	C2		
	Understand the bio-physiological aspects of mammary gland.	C2	1	SAQ
Development Of	Correlate clinical conditions of mammary gland	C3	LGIS	MCQ
Mammary Gland	Apply the strategic use of artificial intelligence in healthcare	C3	]	VIVA
Within ary Gland	Practice principles of bioethics.	C3	]	
	Understand the curative and preventive health care measures.	C3	]	
	Read a relevant research article;	C3	]	
	Use HEC digital library.	C3	]	
	Histology			
	Define Epithelium	C1	]	
	• Discuss general features of Epithelial cells (basal, apical and lateral surfaces)	C2	]	SAQ
Types of Epithelium	Classify epithelium	C2	LOIG	MCQ
1 y pes of Epimenum	Explain the histological structure of simple epithelium	C2	LGIS	VIVA
	Describe the location and functions of simple epithelium	C2		

	Classify stratified epithelium.	C2		
	Describe the functions and distribution of stratified epithelium	C1	]	
	Appreciate the differences between stratified and psuedostratified epithelium	C2	]	
	Describe characteristics of transitional epithelium	C2		
	Correlate clinical aspects of different types of epithelia	C3		
	To understand the bio-physiological aspects of different types of epithelia	C3		
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Understand the curative and preventive health care measures.	C3		
	Practice principles of bioethics	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3		
	Enumerate different apical modifications of cells	C1		
	• Describe histological structure of each apical modification.	C2	LGIS	
	<ul> <li>Discuss functions of each type of apical modifications</li> </ul>	C2		SAQ MCQ
	Correlate clinical aspects of Specializations of apical cell surfaces	C3		
Specializations of	• Understand the bio-physiological aspects of specializations of apical cell surface	C2		VIVA
Apical Cell Surface	• Enlist causes of infertility.	C 1		
_	Apply the strategic use of artificial intelligence in healthcare	C3		
	Practice principles of bioethics	C3		
	• Understand the curative and preventive health care measures.	C3		
	Read a relevant research article	C3	]	
	Use HEC digital library	C3		
	Enumerate different cell junctions	C1		
Intercellular	Describe histological structure of different cell junctions	C2		
Junctions and	Understand the bio-physiological aspects of intercellular junctions and adhesions	C2	LGIS	SAQ
Adhesions	Apply the strategic use of artificial intelligence in healthcare	C3	LGIS	MCQ
Tunestons	Practice principles of bioethics	C3		VIVA
	Understand the curative and preventive health care measures.	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3		
	• Define gland.	C1		
	• Compare between exocrine and endocrine glands with examples.	C2	]	SAQ
Glandular Epithelium	• Classify glands on the basis of morphology, secretory product, and mode of secretion.	C2	LGIS	

	Understand the bio-physiological aspects of glands.	C2		MCQ
	Practice principles of bioethics.	C3		VIVA
	Apply the strategic use of artificial intelligence in healthcare.	C3		
	Understand the curative and preventive health care measures.	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3		
	Describe the Sources of development of mammary gland	C2		
	Discuss the ultra structure of mammary gland	C2		SAQ
Development and	Discuss different stages of activity of mammary gland	C2	LGIS	MCQ
Histology Of	Understand the bio-physiological aspects of mammary gland	C2		VIVA
Mammary Gland	Correlate clinical conditions of mammary glands.	C3		
	Practice principles of bioethics	C3		
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Understand the curative and preventive health care measures.	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3		

## **Physiology Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Lecture Students Should Be Able To:	Domain	Strategy	Tools
Introduction to	Introduce faculty members	C1		
Physiology &	Define physiology	C2		SAQ
Physiology	Classify different branches of physiology	C2	LGIS	MCQ
Department	• Explain the importance of physiology in medical and clinical sciences	C1	SGD	VIVA
	<ul> <li>Understand functional organization of human body from cell to systems</li> </ul>	C2		
Cell physiology	Differentiate between prokaryotes and eukaryotes.	C2	LGIS	M SAQ
& Homeostasis	• Discuss salient features of cell theory	C2	SGD	MCQ
	• Define homeostasis	C1		VIVA
	• Describe homeostatic mechanisms of the major functional systems.	C1		
	Describe distribution of total body water	C1		
	• Enlist the proportion of intra cellular and extra cellular fluids.	C1	LGIS	SAQ

	Differentiate between ECF & ICF	C2	SGD	MCQ
Concept of Body	Recall Physical characteristics of normal ECF constituents	C1		VIVA
Fluid and Internal	• Understand the concept of internal environment (which student can differentiate for unicellular	C2		
Environment	and multi cellular organisms.)			
Ziiviioiiiieit	Describe the characteristic of control system of the body.	C1		
Homeostatic	Enlist four control mechanisms of body	C1	LGIS	SAQ
Control System I	Understand the mechanism of positive feedback, negative feedback, feed forward control and	C2	SGD	MCQ VIVA
	adaptive control with examples.			VIVA
Homeostatic	Recall control mechanisms	C1		
Control System	Give examples	C1		SAQ
II	Compare and contrast feed forward and adaptive mechanisms	C2	LGIS	MCQ
	Define gain of control system	C1	SGD	VIVA
	Comprehend gain of the control system	C2		
	• Calculate gain of the feedback system and understand the significance of sign in the formula	C3		
	Describe cytoskeleton & cell locomotion	C1		
Cellular	Discuss functions of cilia and amoeboid movement	C2	LGIS	SAQ
organelles and cell functions	Describe the mechanism of ATP generation	C1	Group	MCQ
cen functions	Enlist three major processes of ATP consumption in the body	C1	presentati	VIVA
	Understand cell ingestion and other independent roles of cell	C2	ons	
	• Enlist functions of ER, golgi apparatus, lysosome & perxosome, mitochondria	C1	<u> </u>	
	Compare and contrast RER & SER, lysosomes & peroxisomes	C2	LGIS	SAQ
Cell Membrane	Understand Docking mechanism	C2	SGD	MCQ
and Cell	Discuss physiological importance of mitochondria & ATP	C2	Group	VIVA
Organelles, I &	Describe the structure of cell membrane: fluid mosaic model	C1	presentati	
II	Enlist functions of cell membrane	C1	Olis	
	Enlist membrane bound and non-membrane bound organelles	C1		
	Differentiate between cytoplasm and cytosol	C2		
Cell membrane	• Enlist various types of ion channels	C1		
Ion channels,	Enumerate modes of transport mechanism across the cell membrane	C1	LGIS	SAQ

Transport across the cell membrane: Diffusion	Define and discuss factors affecting diffusion	C1	SGD	MCQ VIVA
Transport across	Recall transport mechanism across the cell membrane with special emphasis on osmosis and osmotic pressure	C1		SAQ
cell membrane:	Recall factors affecting osmosis	C1	LGIS	MCQ
Osmosis	Comprehend the concept of moles and osmoles	C2	SGD	VIVA
	Recall osmolarity of body fluids	C1		
	• Discuss tonicity	C2		
	Comprehend concept of isotonic, hypertonic and hypotonic	C2		
Transport across	Define active transport	C1		
cell membrane:	Classify active transport	C2	LGIS	SAQ
Active transport I & II	<ul> <li>Comprehend various types of active transport with examples with special emphasis on Na-K pump</li> </ul>	C2	SGD	MCQ VIVA
	Describe structure of nucleus and ribosome	C1		
	• Discuss vaults	C2		
Structure of	Understand basic concepts about DNA and	C2	LGIS	SAQ
nucleus and	• RNA	C1	PBL	MCQs VIVA
ribosomes,	Recall various types of RNA and their functions	C1		VIVA
Cell Division	<ul> <li>Enlist and Draw steps of mitosis and meiosis</li> </ul>	C2		
	<ul> <li>Comprehend role of different parts of chain of DNA as genes like TATA box</li> </ul>			
Genetics	Define & Explain Genetics, Transcription & Translation			SAQ
Transcription &	Describe Genetic control of protein synthesis		LGIS	MCQs
Translation	Differentiate between apoptosis & Necrosis		PBL	VIVA
Cellular control	Describe different cellular control mechanisms regarding gene regulation	C1		
mechanism ,Cell cycle, Programmed cell death	Explain Cell differentiation, apoptosis and cellular changes in cancer	C2	LGIS PBL	SAQ MCQs VIVA
Gouiii	Describe the structure of various intracellular connections	C1		

Intracellular	Give the physiological importance of cell junctions	C1	LGIS	SAQ
communication			SGD	MCQ
and cell				VIVA
junctions				
	Describe the various 2nd messenger systems	C1		SAQ
Signal	Discuss physiological significance	C2	LGIS	MCQ
Transduction				VIVA

## **Biochemistry Large Group Interactive Session (LGIS)**

Topic	Learning Objectives At the End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
	Cell organelles			
Cell and cell organelles	<ul> <li>Explain composition of normal cell</li> <li>Describe methods to separate different organelles of cell</li> <li>Describe structure, functions and marker enzymes of ER &amp; Golgi apparatus</li> <li>Describe structure, functions and marker enzymes of lysosome, peroxisome &amp; ribosome</li> <li>Describe structure, functions and marker enzymes of mitochondria and Nucleus</li> <li>Illustrate the clinical conditions and congenital defects of cell organelles</li> </ul>	C2 C2 C2 C2 C2 C3	LGIS	MCQs, SAQs & Viva
	Cell membrane and transport across cell mem	brane		
Cell membrane	<ul> <li>Explain composition of cell membrane</li> <li>Understand fluid mosaic model</li> <li>Describe functions performed by each component</li> </ul>	C2 C2 C2	LGIS	MCQs, SAQs & Viva
Functions of cell membranes	Discuss functions & importance of cell membrane	C2	LGIS	MCQs, SAQs & Viva

Transport across cell membrane	<ul> <li>Explain transport of various substances by active and passive transport, diffusion, phagocytosis, endocytosis and exocytosis</li> <li>Correlate the clinical disorders with defective transport across cell membrane</li> </ul> Physicochemical properties of cell	C2 C3	LGIS	MCQs, SAQs & Viva
		<u>C1</u>		MCO
Osmosis, osmotic pressure	<ul> <li>Define osmosis and osmotic pressure.</li> <li>Discuss biochemical application of osmotic and oncotic pressure and methods to measure them.</li> </ul>	C1 C2	LGIS	MCQs, SAQs & Viva
and oncotic pressure	Correlate oncotic pressure with clinical scenarios	C3		
Phenomenon of viscosity,	Define phenomenon of viscosity, surface tension, emulsification and adsorption	C1		MCQs,
surface tension, emulsification and adsorption	Explain Biochemical applications and methods to measure them	C2	LGIS	SAQs & Viva
Donnan equilibrium,	Define Donnan equilibrium, adsorption and ion exchange resins.	C1		MCQs,
adsorption and ion exchange resins	<ul> <li>Describe their effects on tissue fluids and biochemical importance</li> </ul>	C2	LGIS	SAQs & Viva
Water and pH	<ul> <li>Define pH, Pka, body buffer</li> <li>Discuss water distribution in the body</li> <li>Understand dehydration and overhydration</li> </ul>	C1 C2 C3	LGIS	MCQs, SAQs & Viva
	Enzymes		•	
Enzymes Introduction	<ul> <li>Define Enzymes.</li> <li>Explain general functions of enzymes.</li> <li>Differentiate between coenzyme and cofactors</li> </ul>	C1 C2 C2	LGIS	MCQs, SAQs & Viva
Mechanism of enzyme action	Describe different mechanisms of enzyme action.	C2	LGIS	MCQs, SAQs & Viva
Classification of enzymes	Discuss different classes of Enzymes	C2	LGIS	MCQs, SAQs & Viva

Properties of Enzymes	• Elaborate the Properties of Enzymes such as specificity for substrate and stereo specificity.	C2	LGIS	MCQs, SAQs & Viva
Factors affecting Enzyme action	Discuss different factors which increase or decrease the activity of enzymes	C2	LGIS	MCQs, SAQs & Viva
Enzyme inhibitors	Describe enzyme inhibitors and how the activity of the regulatory enzymes can be modulated for benefit of body	C2	LGIS	MCQs, SAQs & Viva
Enzyme Regulation	Explain enzyme regulation	C2	LGIS	MCQs, SAQs & Viva
Diagnostic role of Enzymes	<ul> <li>Interpret the role of measuring activity of different enzymes in the diagnosis and prognosis of different diseases</li> <li>Interpret the role of Enzyme as medicine and their effects on body.</li> </ul>	C3	LGIS	MCQs, SAQs & Viva
	Genetics & Cancer		1	
Nucleic acids chemistry	<ul> <li>Explain structure and biological importance of DNA, types of DNA</li> <li>Differentiate between DNA &amp;RNA</li> <li>Explain structure, types and functions of RNA</li> </ul>	C2 C2 C2	LGIS	MCQs, SAQs & Viva
Replication	Describe mechanism of replication of prokaryotes & Eukaryotes	C2	LGIS	MCQs, SAQs & Viva
Transcription	Describe mechanism of Transcription of prokaryotes & Eukaryotes	C2	LGIS	MCQs, SAQs & Viva
Translation	<ul> <li>Discuss genetic code</li> <li>Describe mechanism of Translation in prokaryotes &amp; Eukaryotes</li> <li>Illustrate mechanism of action of antibiotics at different stages of translation</li> </ul>	C2 C2	LGIS	MCQs, SAQs & Viva

DNA damage & Repair	<ul> <li>Describe mechanism of DNA damage &amp; Repair</li> <li>Apply knowledge of DNA repair mechanisms in related clinical cases</li> </ul>	C2 C3	LGIS	MCQs, SAQs & Viva
Mutations	Describe different types of mutations with examples	C2	LGIS	MCQs, SAQs & Viva
PCR and Recombinant DNA technology	<ul> <li>Define PCR</li> <li>Explain mechanism and indications of PCR</li> <li>Discuss Recombinant DNA technology</li> </ul>	C1 C2 C2	LGIS	MCQs, SAQs & Viva
Cancer	Explain biochemical basis of cancer	C2	LGIS	MCQs, SAQs & Viva

## **Anatomy Small Group Discussion (SGDs)**

Demonstration/Dissection	At the End Of The Demonstration Student Should Be Able To	Learning Domains	Teaching Strategy	Assessment Tool
Anatomicomedical Terminology I (Anatomical Position and Planes)	<ul> <li>Describe different anatomical planes of human body and correlate with radiological anatomy</li> <li>Demonstrate anatomical position of human body</li> <li>Apply the strategic use of artificial intelligence in healthcare</li> </ul>	C2 P C3 C3	Skill lab SGD	MCQ SAQ VIVA OSPE
	<ul><li>Practice principles of bioethics</li><li>Read a relevant research article</li></ul>			
	<ul> <li>Define different terms related to body parts</li> <li>Describe axis of movement</li> </ul>	C1 C2		
Anatomicomedical Terminology	<ul> <li>Demonstrate axis of movement</li> <li>Strategic use of artificial intelligence in healthcare</li> <li>Focus on provision of curative and preventive health care</li> </ul>	P C3 C3	<u> </u>	MCQ
-II (Anatomical Terms and Axis of Movements)	services  • Practice principles of bioethics	C3	Skill lab SGD	SAQ VIVA
	Apply the strategic use of artificial intelligence in healthcare	C3		OSPE

			1	
	Understand the curative and preventive health care measures.	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3		
	Define cell	C1		
	Define tissue	C1		
Anatomicomedical Terminology	Describe basic tissues of human body	C2		MCQ
-III (Cell and Tissues)	Practice principles of bioethics	C3	Skill lab	SAQ
	Apply the strategic use of artificial intelligence in healthcare	C3	SGD	VIVA OSPE
	Understand the curative and preventive health care services	C3		
	Read a relevant research article	C3		
	Use digital library	C3		
Anatomicomedical Terminology-	Describe general organization of different systems of body	C2		MCQ
IV (Skin and Body Systems)	Discuss concepts of skin and fascia	C2	Skill lab	SAQ
	Describe the classification of blood vessels	C2	SGD	VIVA
	Describe the concepts of divisions of nervous system	C1		OSPE
	Describe the formation of spinal nerve	C2		
	Practice principles of bioethics	C3		
	• Understand the curative and preventive health care measures.	C3		
	<ul> <li>Read a relevant research article</li> <li>Apply strategic use of artificial intelligence in healthcare</li> </ul>	C3		
	Use HEC digital library	C3		
	Determine the side	C2		
	Demonstrate anatomical position, general features, attachments and articulations (medial and lateral).	P		
	Describe Intramembranous development and cleido- cranial dysostosis.	C3		MCQ
	Elaborate pectoral girdle formation movement and dislocation.	C3	Skill lab	SAQ VIVA

	Describe ossification in detail and Fracture Of clavicle.	C2, C3	SGD	OSPE
Clavicle	Practice principles of bioethics	C3		
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Understand the curative and preventive health care measures.	C3	-	
	Use HEC digital library	C3	_	
	Read a relevant research article	C3		
	Determine the side	C2		
	Demonstrate anatomical position, general features, attachments, and articulation. (clavicle and shoulder joints)	Р		MCQ
Scapula	Describe scapular anastomosis and its clinical significance	C3	Skill lab SGD	SAQ VIVA OSPE
	Demonstrate Scapular movements.	P		OSFE
	Practice principles of bioethics	C3		
	• Apply the strategic use of artificial intelligence in healthcare	C3		
	• Focus on provision of curative and preventive health care services	C3		
	Use HEC digital library.	C3		
	Read a relevant research article	C3		
	Determine the side	C2		
	Demonstrate anatomical position, general features, attachments and articulation (shoulder and elbow).	P	-	
	Describe the importance of anatomical and surgical neck of humurus	C2		
Humerus	Correlate axillary, radial, median and ulnar nerve damage with respect to various fractures of humerus.	C2		MCQ
	Describe Significance of bicipital groove, angle of humeral torsion and carrying angle	C2	Skill lab SGD	SAQ VIVA
	Discuss Ossification and fractures	C3		OSPE
	Understand the curative and preventive health care measures.	C3		

	Apply the strategic use of artificial intelligence in healthcare	C3		
	Practice principles of bioethics	C3		
	Use HEC digital library	C3		
	Read a relevant research article	C3		
	Describe Superficial fascia with cutaneous nerve and vessels of anterior axioappendicular region and tabulate muscles of the anterior axioappendicular region	C2		
	Understand the bio-physiological aspects of anterior axioappendicular region.	C1		MCQ
	Strategic use of artificial intelligence in healthcare	C3	Skill lab	SAQ
Anterior Axioappendicular Region	<ul> <li>Understand the curative and preventive health care measures</li> <li>Practice principles of bioethics</li> </ul>	C3	SGD	VIVA OSPE
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Use HEC digital library	C3		
	Read a relevant research article	C3		
	Tabulate muscles of the pectoral region (origin, insertion, nerve supply, action and applied).	C2	Skill lab	MCQ
Posterior Axioappendicular	Identify and describe the pectoral and clavipectoral fascia	C2	SGD	SAQ
Muscles	Use HEC digital library	C3		VIVA OSPE
	Understand the curative and preventive health care measures	C3		OSPE
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Read a relevant research article	C3		
	Define axilla	C2		
	Describe its boundaries.	C2		
	• Enumerate the Contents of axilla, (axillary artery with its branches, axillary vein and tributaries, axillary lymphatics, lymph nodes and brachial plexus).	C2	Skill lab	MCQ SAQ
Axilla	Describe the clinical significance of axillary lymph nodes	C3	SGD	VIVA

	Practice principles of bioethics	C3		OSPE
	Understand the curative and preventive health care measures	C3		
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3	1	
	Describe the formation of brachial plexus its roots and trunks.	C2		
Brachial Plexus	Describe the origin and root value of different nerves arising	C2	C1-:11 1-1	MCQ SAQ
	Understand the curative and preventive health care measures	C3	Skill lab SGD	VIVA OSPE
	Practice principles of bioethics	C3		
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Read a research article on brachial plexus	C3		
	Use HEC digital library	C3		
	• Describe the different neurological deficits arising as a result of damaged to roots, trunks and branches of brachial plexus at different levels.	C3		
Brachial Plexus Injuries	Describe the origin and root value of different nerves arising	C3	Skill lab	MCQ SAQ
	Read a research article on brachial plexus	C3	SGD	VIVA
	Understand the curative and preventive health care measures	C3		OSPE
	Practice principles of bioethics	C3		
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3		
	Describe the extent of breast	C2		
	Describe the relations of breast	C2		MCQ
	Describe structure of gland.	C2		

	Discuss the blood supply, venous drainage and	C2		
	lymphatics.		_	
	Correlate Clinical picture and lymphatic spread in breast carcinoma.	C3	Skill lab	SAQ
Breast	Discuss congenital anomalies of breast	C3	SGD	VIVA
	Practice principles of bioethics	C3		OSPE
	Understand the curative and preventive health care measures	C3		
	Read a relevant research article	C3		
	Apply the strategic use of artificial intelligence in healthcare			
	Use HEC digital library	C3		
	• Classify joints and discuss the attachment of capsule and ligaments and discuss the different movement on these joints along with muscles involved in these movements.	C2		
Sternoclavicular and	Describe neurovascular supply.	C2	Skill lab SGD SAQ VIVA	•
acromioclavicular joints	Understand the curative and preventive health care measures	C3		
	Practice principles of bioethics	C3	]	USPE
	Apply the strategic use of artificial intelligence in healthcare	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3		
	• Discuss the surface anatomy of axioappendicular region.	C2	_	
	• Interpret the normal radiologic appearance of bones in axioappendicular region.	C3	Skill lab	MCQ
Surface Anatomy & Radiology	Apply the strategic use of artificial intelligence in healthcare	C3	SGD	VIVA OSPE
	Practice principles of bioethics	C3		
	Understand the curative and preventive health care measures	C3		
	Read a relevant research article	C3		
	Use HEC digital library	C3		

## **Physiology Small Group Discussion (SGDs)**

Topic	Learning Objectives	Learning Domain	Teaching Strategy	Assessment Tools
	Understand functional organization of human body	C2		MCQ
Cell and homeostasis	Discuss homeostasis/control systems of the body	C2	SGD	SAQ
	Discuss the functions of cell	C2		VIVA MCQ
Cell cytoskeleton and locomotion and cell functions	Describe cell cytoskelation	C1	SGD	SAQ VIVA
	Describe the structure of cell membrane	C1		
	Enlist various ion channels	C1	SGD	MCQ
Transport across cell membrane	Discuss transport mechanism across the cell membrane with	C2		SAQ
	special emphasis on diffusion and osmosis			VIVA
	Explain the types of active transport	C2		
Intracellular communication and	Describe the structure and function of various intracellular	C1		MCQ
cell junction, signal transduction	connections	C2	SGD	SAQ
	Discuss second messanger system			VIVA

## **Biochemistry Small Group Discussion (SGDs)**

Topic	Learning Objectives	Learning	Teaching	Assessment
		Domain	Strategy	Tools
	Explain Composition of Normal Cell & Cell Organelles	C2		MCQ
Cell and Cell	Describe Composition of Cell Membrane	C2	SGD	SAQ
Membrane	Understand Fluid Mosaic Model			VIVA
	Define osmosis and osmotic pressure.	C1		
	Discuss biochemical application of osmotic and oncotic pressure and methods to	C2	SGD	MCQ
	measure them.	C3		SAQ
Physicochemical	Correlate oncotic pressure with clinical scenarios			VIVA
Aspects of Cell	Define phenomenon of viscosity, surface tension.	C1		
	Explain Biochemical applications and methods to measure them.	C2		

Define Donnan equilibrium, adsorption and ion exchange resins.	C1		MCQ
Describe their effects on tissue fluids and biochemical importance	C2	SGD	SAQ
			VIVA

## **Anatomy Self Directed Learning (SDL)**

<b>Topics Of SDL</b>	Learning Objectives	Learning Resources
Clavicle	<ul> <li>Determine the side</li> <li>Demonstrate anatomical position, general features, attachments and articulations (medial and lateral).</li> <li>Describe Intramembranous development.</li> <li>Describe ossification in detail and Fracture of Clavicle</li> <li>Able to read a relevant research article</li> </ul>	<ul> <li>❖ Clinical Oriented Anatomy by Keith L. Moore.8<sup>TH</sup>         Edition. Clavicle (Chapter 3, Page143,153,154).</li> <li>❖ https://www.youtube.com/watch?v=Ykfzt-olaYs</li> </ul>
Scapular Anastomosis and Its Clinical Significance	<ul> <li>Determine the side</li> <li>Demonstrate anatomical position, general features, attachments and articulations (medial and lateral).</li> <li>Describe scapular anastomosis and its clinical significance</li> <li>Able to read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Scapula (Chapter 3, Page143-145,154,171,172).</li> <li>https://www.youtube.com/watch?v=zFawNgaSL6E</li> </ul>
Anterior axioappendicular muscles	<ul> <li>Describe Superficial fascia with cutaneous nerve and vessels of anterior axioappendicular region.</li> <li>Understand the bio-physiological aspects of anterior axioappendicular region.</li> <li>Able to read a relevant research article and use digital library</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH         Edition. Anterior axioappendicular muscles (Chapter 3, Page 168,169).     </li> <li><a href="https://teachmeanatomy.info/">https://teachmeanatomy.info/</a></li> </ul>
Posterior axioappendicular muscles	<ul> <li>Tabulate Muscles of the pectoral region (origin, insertion, nerve supply, action and applied).</li> <li>Identify and describe the pectoral and clavipectoral fascia.</li> <li>Able to read a relevant research article and use digital library</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH         Edition. Posterior axioappendicular muscles (Chapter 3, Page 170,171).     </li> <li><a href="https://teachmeanatomy.info/">https://teachmeanatomy.info/</a></li> </ul>
Axilla	<ul> <li>Define axilla</li> <li>Describe its boundaries,</li> <li>Enumerate the Contents of axilla, (axillary artery with its branches, axillary vein and tributaries, axillary lymphatics, lymph nodes and brachial plexus).</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Axilla (Chapter 3, Page 183-190,197,198).</li> <li>https://teachmeanatomy.info/</li> <li>https://www.youtube.com/watch?v=uSMugI_NNJc</li> </ul>
Brachial plexus	<ul> <li>Describe the formation of brachial plexus its roots and trunks.</li> <li>Describe the origin and root values of different nerves arising</li> <li>Able to read a research article on brachial plexus</li> <li>Able to use digital library</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Brachial plexus (Chapter 3, Page 191-196).</li> <li>https://www.youtube.com/watch?v=1qgqrXlpr1Y</li> </ul>

Brachial plexus injuries	<ul> <li>Describe the different neurological deficits arising as a result of damaged to roots, trunks and branches of brachial plexus at different levels.</li> <li>Able to read a research article on brachial plexus</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Brachial plexus injuries (Chapter 3, Page 199-200).
		https://teachmeanatomy.info/
		https://www.youtube.com/watch?v=c9giLkwgYA0
Breast	<ul> <li>Describe the extent of breast</li> <li>Describe the relations of breast</li> <li>Describe structure of gland.</li> <li>Discuss related clinical</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. Breast (Chapter 4, Page 315-318,323-326).</li> <li>https://www.youtube.com/watch?v=OW0qQnT5GoA</li> </ul>

## **Physiology Self Directed Learning (SDL)**

Topics Of SDL	Learning Objectives	Learning Resources
Concept of body fluids & internal environment.	<ul> <li>Introduction</li> <li>Concept of extracellular and intracellular fluid</li> <li>Homeostasis</li> <li>Examples of control system</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition, General principles and Energy production in Medical Physiology (chapter 01, Page 03)</li> <li>Human Physiology by Dee Unglaub Silver thorn.         8<sup>TH</sup>Edition.Introduction to physiology, controlsystems and homeostasis, chapter no. 1, page no. 40.49</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular physiology, chapter 01. Page 1</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Introduction to Physiology.(Section 01, Chapter 1, page 03).</li> </ul>
Cell membrane & classification ofcell organelles	<ul> <li>Structure of cell membrane</li> <li>Cell cytoskeleton</li> <li>Cytoplasm and various organelles</li> <li>Golgi Apparatus and its function</li> <li>Lysosomes and peroxisomes</li> <li>Secretory vesicles</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Editions,         Overview of Cellular Physiology in Medical Physiology         (chapter 02, Page33)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.         Compartmentation, chapter 3, page95</li> <li>Physiological Basis of Medical Practice by Best &amp;         Taylor's.13<sup>th</sup>Edition. The cell (chapter 01, section 1 Page 03,         18)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>         Edition. Introduction to Physiology.(Section 1, chapter 03,         page 31)</li> </ul>

Intracellular communication and cell junction	<ul> <li>Receptors and its types</li> <li>Cellular signaling and various mechanisms</li> <li>Signal transduction</li> <li>Hormone receptors and their activation</li> <li>Second messenger mechanisms</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition.,         Overview of Cellular Physiology inMedical Physiology         (chapter 02, Page 33-44)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup>Edition.         Compartmentation, chapter 3, page 109</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Gastrointestinal         Physiology</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>         EditionThe cell (chapter 01, Page 14)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>Edition.         Introduction to Endocrinology.(Section 14, Page 920)</li> </ul>
Receptors and signal transduction	<ul> <li>Receptors and its types</li> <li>Cellular signaling and various mechanisms</li> <li>Signal transduction</li> <li>Hormone receptors and their activation</li> <li>Second messenger mechanisms</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Editions,         Overview of Cellular Physiology inMedical Physiology         (Chapter 02, Page 41)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.         Communication, chapter 6, page 204</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>         Edition. Section 7, principles ofhormone action and endocrine         control (Chapter 50, Page817)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>         Edition. Introduction to Physiology.(Section 1, Chapter 02,         page 13)</li> </ul>
Homeostasis Control System- I (Negative Feedback System, Conceptof Error and Gain)	<ul> <li>Control systems of body</li> <li>Negative and positive feedback mechanism and their examples</li> <li>Apoptosis and necrosis</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition,         Overview of Cellular Physiology inMedical Physiology         (Chapter 02, Page 62)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.         Introduction to physiology, chapterno. 1, page no. 45</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>         Edition. Introduction to Physiology.(Section 1, Chapter 1, page 04,07) (Chapter 03, Page 45)</li> </ul>
Genetics, Transcriptionand Translation	<ul> <li>Building blocks of DNA</li> <li>Genetic code</li> <li>Process of transcription and translation</li> <li>Types of RNA</li> <li>Cell division</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition, General principles and Energy production in Medical Physiology (Chapter 01, Page 63)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>Edition.</li> <li>(Section 01, Chapter 03, Page 31)</li> </ul>

Structure of Nucleus, Ribosomes andCell Division	<ul> <li>Structure of Nucleus</li> <li>Ribosomes</li> <li>Mitosis &amp; Overview of cancer</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition,         Overview of Cellular Physiology inMedical Physiology         (Chapter 02, Page42)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup>Edition.         Compartmentation, chapter 3, page 100</li> <li>Physiological Basis of Medical Practice by Best &amp;         Taylor's.13<sup>th</sup> Edition. the cell (Chapter 01, Page7,)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>Edition.         (Section 01, Chapter02, Page 19)</li> </ul>
Transport across cell membrane andits various types (osmosis, diffusion, primary and secondary active transport	<ul> <li>Types of transport across cell membrane</li> <li>Diffusion and osmosis</li> <li>Concept of gating of channels</li> <li>Primary active transport</li> <li>Secondary active transport</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition,         Overview of Cellular Physiology inMedical Physiology         (Chapter 02, Page 45)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.         Membrane dynamics chapter 5,page 160</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular physiology, chapter 1, page 5</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>         Edition. Properties and functions of cell membrane, chapter 2, page         18</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.         Membrane Physiology. (Section 02, Chapter 04, Page 51)</li> </ul>

## **Biochemistry Self Directed Learning (SDL)**

Topics Of SDL	Learning Objectives	Learning resources
Cell and cell organelles	<ul> <li>Explain composition of normal cell</li> <li>Describe methods to separate different organelles of cell</li> <li>Describe structure, functions and marker enzymes of ER &amp; Golgi apparatus</li> <li>Describe structure, functions and marker enzymes of lysosome, peroxisome &amp; ribosome</li> <li>Describe structure, functions and marker enzymes of mitochondria and Nucleus</li> <li>Illustrate the clinical conditions and congenital defects of cell organelles</li> </ul>	★ Essentials of medical Biochemistry. Mushtaq Ahmad Vol – I 9 <sup>th</sup> edition (chapter 1, page 3)

Cell membrane Transport across cell membrane	<ul> <li>Explain composition of cell membrane</li> <li>Understand fluid mosaic model</li> <li>Describe functions performed by each component</li> <li>Explain transport of various substances by active and passive transport, diffusion, phagocytosis, endocytosis and exocytosis</li> <li>Correlate the clinical disorders with defective transport across cell membrane</li> </ul>	<ul> <li>Harper's illustrated biochemistry 32<sup>nd</sup> edition (chapter 40 page - 460)</li> <li>Harper's illustrated biochemistry 32<sup>nd</sup> edition (Chapter 40 page 467)</li> </ul>
Physichemical Aspects Osmosis, osmotic pressure and oncotic pressure	<ul> <li>Define osmosis and osmotic pressure.</li> <li>Discuss biochemical application of osmotic and oncotic pressure and methods to measure them.</li> <li>Correlate oncotic pressure with clinical scenarios</li> </ul>	<ul> <li>❖ Essentials of medical Biochemistry.</li> <li>Mushtaq Ahmad Vol − I 9<sup>th</sup> edition (Chapter 02 page 46)</li> </ul>
Phenomenon of viscosity, surface tension.	<ul> <li>Define phenomenon of viscosity, surface tension.</li> <li>Explain Biochemical applications and methods to measure them.</li> </ul>	<ul> <li>❖ Essentials of medical Biochemistry.</li> <li>Mushtaq Ahmad Vol − I 9<sup>th</sup> edition (Chapter 02 page 52, 55)</li> </ul>
Nuleic Acid Chemistry	<ul> <li>Define Donnan equilibrium, adsorption and ion exchange resins.</li> <li>Describe their effects on tissue fluids and biochemical importance</li> </ul>	<ul> <li>Essentials of medical Biochemistry.</li> <li>Mushtaq Ahmad Vol – I 9<sup>th</sup> edition (Chapter 02 page 50)</li> </ul>
Cancer	Explain biochemical basis of cancer	<ul> <li>❖ Essentials of medical Biochemistry.</li> <li>Mushtaq Ahmad Vol − I 9<sup>th</sup> edition (Chapter 6 page 168)</li> </ul>
Diagonostics Role of Enzyme	Interpret the role of Enzyme in diagnosis and their effects on body.	<ul> <li>Essentials of medical Biochemistry.         Mushtaq Ahmad Vol – I 9<sup>th</sup> edition         (Chapter 06 page 169)</li> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 05 page 69)</li> </ul>
Transciption	Describe mechanism of Transcription of prokaryotes & Eukaryotes	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 30 page 459)</li> </ul>

### **Histology Practicals Skill Laboratory (SKL)**

Practical	At The End Of The Practical Student Should Be Able To	Learning Domains	Teaching Strategy	Assessment Tool
	Identify different types of microscopes.	C1	Strategy	1001
Introduction to	<ul> <li>Describe functions of different parts of microscope.</li> </ul>	C1	Skill lab	OSPE
Microscope	<ul> <li>Identify different types of lenses.</li> </ul>	<u>C1</u>	Demonstration	
	• Focus slides.	Р		
	Classify epithelium.	C2		
Simple epithelium	Illustrate different types of simple epithelium	P	Skill lab Demonstration	OSPE
	Identify types of simple epithelium.	P		
	Write two points of identification	C1		
	Classify stratified epithelium.	C1		
Stratified epithelium	• Illustrate different types of stratified epithelium	<b>C</b> 1	Skill lab	OSPE
/Transitional	Discuss functions of stratified epithelium	C2	Demonstration	
Epithelium	• Enlist sites of specific type of epithelium	C2		
	Identify epithelium under microscope	<b>C</b> 1		
	Write two points of identification	P		
	• Illustrate the different stages of activity of mammary gland	C2	Skill lab	
Mammary gland	• Identify the slides of different stages of mammary gland	P	Demonstration	OSPE

## **Physiology Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives	Learning	Teaching	Assessment
		Domain	Strategy	Tool
Introduction to Microscope	• Identification of different parts especially focusing lenses and their uses	C1	Skill Lab	OSPE
	• Focusing technique of different blood slides e.g Neubauer's chamber TLC & DLC slides	P		
	Identify the wintrobe and westergen tubes	C1		

Introduction to Wintrobe & Westergen tube	Should know the differences between two tubes and uses in different methods	P	Skill Lab	OSPE
Apparatus identification (Introduction to Neubauer's chamber, Red Blood Cell (RBC) pipettes& White Blood Cell (WBC)	<ul> <li>Complete study of Neubauer's slide, calculation of volumes of corner squares and central squares</li> <li>Important differentiating points between WBC &amp; RBC's pipettes</li> <li>How to dilute the two pipettes</li> <li>Should know the composition of diluting fluids</li> </ul>	P C1 P C1	Skill Lab	OSPE
pipette				
Apparatus identification (Introduction to centrifuge machine)	Be aware with the electrical connections of centrifuge machine and to control different speeds	P, A	Skill Lab	OSPE

## **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to Laboratory precautions and glassware	<ul><li> Understand the use of laboratory glassware</li><li> State precautions while working in the laboratory</li></ul>	P	Skill Lab	OSPE
Introduction of Laboratory equipments	Describe parts and working of different laboratory equipments	P	Skill Lab	OSPE
Physic chemical principals: emulsification and surface tension	Demonstrate mechanism of surface tension and emulsification	Р	Skill Lab	OSPE
Physic chemical principals: tonicity and adsorption	<ul> <li>Demonstrate effects of solutions of different tonicity on red cells (isotonic, hypotonic and hypertonic)</li> <li>Illustrate process of adsorption.</li> </ul>	Р	Skill Lab	OSPE

#### **Orientation Sessions of Medical Education and Mangement Courses**

#### Content

- Opening Ceremony (DME)
- Introduction to Digital Services Of RMU
- Introduction to Integrated Modular Curriculum, Study Guide sand RMU Policies
- Assessment Model of RMU & Continuous Internal Assessment
- Research Model of RMU (IUGRC), Biomedical Ethics Family Medicine, Artificial Intelligence
- Introduction to Different Teaching Strategies, Role of Team Leader Facilitator and Students SGD/LGIS/TBL/PAL/INTERNET & Literature Group activity (DME)
- Orientation to Integrated Modular System for Pre-clinical Years (DME)
- Lecture on Feedback (DME)
- Mission and Vision (DME)
- Introduction to Pharmacology
- Introduction to Pathology

# **Opening Ceremony (DME)**

Program of Welcome Ceremony				
Sr. No.	Activity	Name	Time	
1.	Seating of Students in Auditorium		8.00AM To 8:30AM	
2.	Welcome words and announcement of	Dr. Sidra Hamid	9:00AM	
	the Ceremony			
3.	Tilawat-e-Quran Pak	Dr. Fahad Anwar	9:05AM	
4.	Haddiya-e-Naat	Mr. Waqar	9:10AM	
5.	Invitation to distinguished guests on Sta	ige	9:15AM	
6.	Vice Chancellor welcome address	Prof. Dr. Muhammad Umar	9:30AM	
7.	Welcome address by Principal RMC	Prof. Dr. Jahangir Sarwar Khan	9:45AM	
8.	White Coat Ceremony (05 High achievers among boys) (5 High achievers among girls)	Prof. Dr Muhammad Umar	10:00AM	
9.	Oath Taking	Prof. Dr. Muhammad Umar	10:15AM	
10.	Welcome Note by Director DME	Prof. Dr Rai Muhammad Asghar	10:30AM	
11.	Introduction to IT services RMU by Director IT	Mr. Hafiz Shahid Rasool	10:45AM	
12.	Introduction to Hostel & Transportation	Prof. Dr. Naeem Zia	11:00AM	
	Concluding remark	ks by Dr. Sidra Hamid		

### **Medical Education**

Topic	Learning Objectives	Teaching	Assessment
	At the end of the lecture the student should be able to	Strategy	Tool
Orientation of Integrated Modular system, Intoduction to study guides and RMU Policies	<ul> <li>Understand the concept of integration</li> <li>Understand the orientation of integrated modular curriculum of RMU</li> <li>How to use Study Guides</li> </ul>	LGIS	MCQs
Introduction to Assessment Model of RMU	<ul> <li>Introduction to different policies of RMU</li> <li>Discuss the concept of Continous internal assessment</li> <li>To comprehend the rules of eligibility of professional examination</li> </ul>	LGIS	MCQs
RMU Goes digital	<ul> <li>Introduction to LMS, CMS and MS Teams.</li> <li>Inrtorduction to RMU website</li> <li>How to use HEC digital library</li> <li>How to use up to date website</li> </ul>	LGIS	MCQs
Vision & Mission	<ul> <li>Discuss the vision and mission of RMU</li> <li>Discuss the implications of under standing vision and mission of and organization</li> </ul>	LGIS	MCQs
Leadership	<ul> <li>Define clinical leadership</li> <li>Differentiate between management and leadership</li> <li>Types of leadership style</li> </ul>	LGIS	MCQs
Professionalism	<ul> <li>Define medical professionalism</li> <li>Describe attributes of healer and professional</li> <li>Discuss the social contract of medical profession</li> <li>List values, skills and behavior for professionalism</li> </ul>	LGIS	MCQs
Lecture on feedback	<ul> <li>Receive and provide effective feedback</li> <li>Describe types of feedback</li> <li>Discuss principles of feedback</li> <li>Discuss essential elements of feedback</li> </ul>	LGIS	MCQs
Islam and Medical Science	Discuss role of Islam and importance of Islam in Medical Science	LGIS	MCQs

# **Orientation Sessions and Mangement Courses lectures**

Sr. No	Date/Day	Department	Time	Topic of Lectures	Teachers Name & Contact #
1	12-02-24 Monday	DME	08:30 AM – 11:00 AM	Opening Ceremony	Worthy VC RMU, Dean Basic Sciences, DME & DME team, Senior faculty
2	12-02-24 Monday	DME	11:00 AM -11:40 AM	Introduction to Integrated Modular Curriculum, Student Guide and RMU Policies	Dr Sidra Hamid 0331-5025147
3	12-02-24 Monday	Physiology	11:40 AM – 12:20 AM	Assessment Model of RMU And Continuous Internal Assessment	Prof. Dr Samia Sarwar
4	12-02-24 Monday	Family Medicine & Community Medicine	12:20 PM – 01:00 PM	Research Model Of RMU, Biomedical Ethics, Family Medicine, Artificial Intelligence	Dr. Sadia Khan 0343-8509230 Dr. Khula Noreen 0333-5386482
5	12-02-24 Monday	IT Department	01:00 PM – 2:00 PM	Introduction to Digital Services RMU	Hafiz Shahid Rasool (Director IT)
6	15-02-24 Thursday	DME/Bioethics	10.00 AM – 11:00 AM	Introduction to Different Teaching Strategies, Role of Team Leader Facilitator and Students SGD/LGIS/TBL/PAL/Internet & Literature Group activity	Dr Sidra Hamid 0331-5025147 Dr. Rizwana 0323-5375362
7	16-02-24 Friday	Islam And Medical Sciences/ Quran Translation	8.00 AM – 9.00 AM	Islam & medical science (Mulana AbdulWAhid)  Introduction to Quran translation	Mufti Naeem Shairazi 0300-5580299 Mulana Abdul Wahid Abassi 0341-5444667
8	16-02-24 Friday	DME	10:00 AM – 11:00 AM	Leadership Professionalism: Dr. Arsalan Introduction to Medical Ethics: Dr. Sidra	Dr. Sidra Hamid 0331-5025147 Dr. Arsalan Mughal 0334-3911629
9	17-02-2024 Saturday	DME	10:00 AM – 11:00 AM	Leadership Professionalism: Dr. Arsalan Intriduction to medical ethicsDr. Sidra Hamid	Dr. Sidra Hamid 0331-5025147 Dr. Arsalan Mughal 0334-3911629

10	19-02-2024	DME	10:00 AM – 11:50 AM	Entrepreneurship	Dr. Asif
	Monday				
11	23-02-24	Islam and	09:00 AM – 10:00 AM	Introduction to Quran Translation	Mufti Naeem Shairazi
	Friday	medical sciences		Islam and medical sciences	0300-5580299
					Mulana Abdul Wahid Abassi 0341-
					5444667
12	01-03-2024	DME	9:00 AM – 10:00 AM	Lecture on feedback (Dr. Sidra Hamid)	Dr Sidra Hamid 0331-5025147
	Friday			Mission and vision (Dr Arsalan	Dr. Arsalan Mughal
					0334-3911629
13	05-03-24	DME	10:00 AM – 11:00 AM	Lecture on feedback (Dr. Sidra Hamid)	Dr Sidra Hamid 0331-5025147
	Tuesday			Mission and vision (Dr Arsalan	Dr. Arsalan Mughal 0334-3911629

### **Introductory Lecture of Different Dicipilnes**

Sr. #	Date/Day	Department	Time	Topic of Lectures	Teachers Name & Contact #		
			Week	One			
1.	13-02-24	Behavioral	11:00 AM – 12:00 PM	Introduction to Behavioral	Prof. Dr. Asad Tamizudin		
	Tuesday	Sciences		Sciences	0333-5167705		
2.	13-02-24	Pharmacology &	12:00 PM – 01: 00 PM	Introduction to Pharmacology	Dr. Zaheer 0333-5716320		
	Tuesday	Pathology	(Even Roll No) 12:00 PM -01:00 PM (Odd	Introduction to Pathology			
			Roll No) They will switch at 12:30pm		Dr. Mudassira 0307-239757		
3.	14-02-24	Community	12:20 PM - 1:00 PM	Introduction to Health Research	Dr. Rizwana 0323-5375362		
	Thursday	Medicine		Process and Researcher	Dr. Khula Noreen 03335386482		
4.	14-02-24	Behavioral	10.00AM – 11:00 AM	Management of Stress	Dr. Sadia Tahir 0333-4746639		
	Wednesday	Sciences			Dr. Zona Tahir 0315-5000055		
5.	17-02-24	Medicine	11:00 AM – 12:00 PM	Introduction to Medicine	Dr. Sadaf Zaman 0334-5182252		
	Saturday				Dr. Sana Ahmad 0322-4726427		
	Week Three						
6.	26-02-24	Medicine	10:00 AM – 11:00 AM	Introduction and History of	Dr. Sualeha Imran 0336-5270575		
	Monday			medicine	Dr. Ayesha Hijab 0331-2291113		

### **Basic and Clinical Sciences (Vertical Integration)**

### Content

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

# **Basic and Clinical Sciences (Vertical Integration)**

### **Case Based Learning (CBL)**

Subject	Topic	Learning Objectives	Learning
		At the end of the lecture the student should be able to	Domain
	Fracture of clavicle	Apply basic knowledge of subject to study clinical case.	C3
Anatomy	<ul> <li>Winging of scapula due to long thoracic nerve injury</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
	Down's syndrome	Apply basic knowledge of subject to study clinical case.	C3
Physiology	Smoker's cough	Apply basic knowledge of subject to study clinical case.	C3
	• Enzymes	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• Genetics/PCR	Apply basic knowledge of subject to study clinical case.	C3

### **Large Group Interactive Sessions (LGIS)**

### **Pathology**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tools
	Define the following terms:	C1		
Introduction to	Etiology		LGIS	MCQ
Pathology	• Pathogenesis		SGD	
	Morphology			
	Discuss cellular responses to injury for:	C2		
Cellular	Reversible injury			
Responses to	Adaptation		LGIS	MCO
Injury	Irreversible injury		SGD	MCQ
	Cell death		SGD	
	Describe, the morphologic changes in cell injury culminating in	C2		

	necrosis and apoptosis			
	• Describe types of intracellular accumulations with clinical examples:	C2		
Intracellular	• Lipids/ fat		LGIS	MCQ
Accumulations	Protein		SGD	
	Glycogen			
	• Pigments			
	Explain mechanism of intracellular accumulations.	C2		
	Enlist causes of fatty change	C1		
	Describe the pathogenesis of fatty liver	C1		
	Classify pigments	C2		
	• Explain the mechanism of pigment production and deposition in	C2		
D'	various clinical settings		I GIG	MCQ
Pigments	Describe the morphological features (gross/ microscopic) with	C1	LGIS	
	deposition of following pigments:		SGD	
	Lipofuscin, Melani, Hemosiderin, Bilirubin, Anthracosis			
Free Radicals/	1. Define ROS/free radicals	C1		
Reactive	2. Enlist oxygen derived free radicals	C1		
Oxygen	3. Describe mechanism of generation of free radicals	C2	I GIG	
Species (Ros).	4. Describe mechanism of removal of free radicals(antioxidants)	C2	LGIS SGD	MCQ
Oxidative Stress	5. Describe the pathologic effects of free radicals	C2	SGD	
Irreversible	Define necrosis	C1		
Injury.	Enlist patterns/types with clinical examples	C1	LGIS	MCQ
Necrosis	Describe morphological changes (gross and microscopic) in necrosis	C2	SGD	
	Define apoptosis	C1		
Apoptosis	Enlist clinical examples of apoptosis in	C1	LGIS	MCQ
(Irreversible	physiologic conditions		SGD	
Injury)	Enlist clinical examples of apoptosis in pathologic conditions	C1	1	
	Describe mechanism of apoptosis	C2		
	Tabulate differences between necrosis and apoptosis	C1	1	
	Classify human genetic disorders	C1		
	Define mutation	C1	LGIS	MCQ
	- Define material			

	Define the following inheritance pattern:	C1	SGD	
Genetic	Autosomal dominant		PBL	
Disorders	Autosomal recessive			
	X-linked			
	Describe diseases associated with consanguineous marriages	C2		

### Pharmacology

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
	Define pharmacology	C1		
Introduction to	Discuss main branches of Pharmacology	C2		
	Define drug according to WHO	C1	LGIS	MCQ
Pharmacology	Describe drug nomenclature	C1	LGIS	WEQ
Thaimacology	Cite important drug references	C1		
	Describe the sources of drug	C2		
	Enlist different routes of drug administration	C1		
Routes of drug	Discuss the merits and demerits of each route of drug administration	C2	LGIS	MCQ
administration	• Identify the factors the influence the choice of the route of drug administration	C2		
	Define drug absorption	C1	LGIS	
Absorption of	Identify different sites of drug absorption	C1		MCQ
drugs	• Recall transport processes utilized by the drug for absorption across different sites	C1		
	•			
Factors	Enlist drug and body related factors affecting drug absorption	C1		
affecting absorption of drugs	Briefly discuss different factors affecting drug absorption	C2	LGIS	MCQ
Distribution of	Define distribution of drug	C1		
	Identify different body compartments	C1	LGIS	MCQ
drugs	Explain distribution of drug through various body compartments	C2		
	Enlist factors affecting distribution of drugs	C1		

### **Community Medicine**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
	Describe Man and medicine towards health for all	C1		
Health for All	Explain different eras of medicine	C1	LGIS	MCQS
	Describe different systems of medicine	C1		
Genetics	Discuss Population Genetics	C1	LGIS	MCQS
	_		PBL	

### Medicine

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Medicine	Define evidence-based Medicine	C1		
Evidence based	Discuss its applications.	C2	LGIS	MCQs
medicine	• Discuss components of EBM.	C2		
Bedside	Explain how to take history of the patient and which	C2	T GTG	1100
teaching	steps to follow		LGIS	MCQs
General	Explain How to perform GPE	C2		
physical	Discuss the importance of various signs	C2	LGIS	MCQs
examination	Discuss its correlation with systemic examination	C2		

### Surgery

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
History taking	Enlist the components of a detail history	C1		
& its	Describe Importance of each component	C2	LGIS	MCQs
importance	-			
	Describe the extension of breast	C1		
Breast surgery	Discuss different condition requiring breast surgery	C1	LGIS	MCQs
Enlist steps involved in breast surgery		C1		
	Describe outcomes of breast surgery	C1		

### Obstetrics & Gynaecology

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Introduction to	<ul> <li>Understand the process of conception and</li> </ul>			
Fertilization,	implantation.	C2	LGIS	MCQs
Implantation,	Know the importance of embryogenesis	C2		
embryogenesis,	Identify major structural abnormalities	C1		
congenital	Understand the factors involved in fetal structural			
abnormalities	abnormalities	C2	LGIS	MCQs

### **Peadiatrics**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Medical Genetics & Dysmorphology	Describe the chromosomal abnormality and clinical features of trisomy 21	C2	LGIS	MCQs

# **List of Foundation Module Basic and Clinical Sciences Vertical Integration Lectures**

<b>Sr.</b> #	Date/Day	Department	Time	Topic of Lectures	Teachers Name & Contact #
			•	Week One	
1.	13-02-24 Tuesday	Behavioral Sciences	11:00 AM – 12:00 PM	Introduction to Behavioral Sciences	Prof. Dr. Asad Tamizudin 0333-5167705
2.	13-02-24 Tuesday	Pharmacology & Pathology	12:00 PM – 01: 00 PM (Even Roll No) 12:00 PM -01:00 PM (Odd Roll No) They will switch at 12:30pm	Introduction to Pharmacology  Introduction to Pathology	Dr. Zaheer 0333-5716320  Dr. Mudassira 0307-239757
3.	14-02-24 Thursday	Community Medicine	12:20 PM - 1:00 PM	Introduction to Health Research Process and Researcher	Dr. Rizwana 0323-5375362 Dr. Khula Noreen 03335386482
4.	14-02-24 Wednesday	Behavioral Sciences	10.00AM – 11:00 AM	Management of Stress	Dr. Sadia Tahir 0333-4746639 Dr. Zona Tahir 0315-5000055
5.	15-02-24 Thursday	Community Medicine	1.00 PM - 2.00 PM	Characteristic of Research Process and Health Research Process	Dr. Rizwana 0323-5375362 Dr. Imran Younas 0345-5892287
6.	16-02-24 Friday	Pharmacology	11:00 AM - 12:00 PM	Route of Drug Administration	Dr. Zoefishan 0321-8826591
7.	17-02-24 Saturday	Medicine	11:00 AM – 12:00 PM	Introduction to Medicine	Dr. Sadaf Zaman 0334-5182252 Dr. Sana Ahmad 0322-4726427
8.	17-02-24 Saturday	Community Medicine	1:00 PM - 2:00 PM	Research III: Basis of ethics in health research	Dr. Rizwana 0323-5375362 Dr. Muniba Iqbal 0335-5609069
			1	Week Two	
9.	21-02-24 Wednesday	Pathology	10:00 AM – 11:00 AM	Cellular Response to Injury	Dr. Abid 0300-5332565 Dr. Ayesha 0311-5185989
10.	21-02-24 Wednesday	Pharmacology	11:00 AM – 12:00 PM	Absorption of Drugs	Dr. Arsheen 0335-5425558
11.	22-02-24 Thursday	Pathology	8:00 AM – 9:00 AM	Intracellular accumulations	Dr. Abid 0300-5332565 Dr. Ayesha 0311-5185989

12.	23-02-24	Pharmacology	11:00 AM – 12:00 PM	Factors affecting drug absorption	Dr. Memuna 0333-0430482
	Friday				
23	24-02-24	Pharmacology	11:00 AM – 12:00 PM	Distribution of drugs	Dr. Uzma 0336-5178766
	Saturday				
			V	Veek Three	
24	26-02-24	Medicine	10:00 AM – 11:00 AM	Introduction and History of medicine	Dr. Sualeha Imran 0336-5270575
	Monday				Dr. Ayesha Hijab 0331-2291113
25	28-02-24	Pathology	9:00 AM – 10:00 AM	Pigments	Dr. Ayesha 0311-5185989
	Wednesday				Dr. Abid 0300-5332565
26	29-02-24	Pediatrics	8.00 AM – 9.00 AM	Medical genetics and Dysmorphology	Dr. Sadaf Ijaz 03335277579
	Thursday				Dr. Mamoona Qudrat 0333-
					5437579
27	01-03-24	Community	8.00 AM – 9.00 AM	Research IV. basics of ethics in	Dr. Rizwana 0323-53753632
	Thursday	Medicine		medical research	Dr. Muniba Iqbal 0335-5609069
			•	Week Four	
29	04-03-2024	Pathology	9:00 AM – 10:00 AM	Free radical and reactive oxygen	Dr. Ayesha 0311-5185989
	Monday			species	Dr. Abid 0300-5332565
31	06-03-24	Pathology	10:00 AM – 11:00 AM	Irreversible injury/necrosis	Dr. Ayesha 0311-5185989
	Wednesday				Dr. Abid 0300-5332565
32	08-03-24	Pathology	8:00 AM – 9:00 AM	Irreversible Cell Injury/Apoptosis	Dr. Ayesha 0311-5185989
	Friday				Dr. Abid 0300-5332565
				Week Five	
33	11-03-24	Medicine	11:00 AM – 11:50 AM	Chromosomal Abrasions	Dr. Madeha Nazar 0332-7777658
	Monday				Dr. Unaiza 0305-7910755
34	12-03-24	Gyne and Obs	11:00 AM – 11:50 AM	Introduction to fertilization,	Dr. Ammara Arooj 0331-5119677
	Tuesday			implantation, embryogenesis and	Dr. Maryum 0332-5390464
				congenital anomalies	
35	13-03-24	Pathology	9:00 AM – 9:50 AM	Genetic disorders	Dr. Ayesha 0311-5185989
	Wednesday				Dr. Abid 0300-5332565
36	15-03-24	Medicine	11:00 AM – 12:00 PM	History taking and general physical	Dr. Imran saeed 0333-5357955
	Friday			examination	Dr. Saima Mir 0343-5761430

### **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

#### **Content**

- Longitudinal Themes
  - o The Holy Quran Translation
  - o Biomedical Ethics & Professionlism
  - o Behavioural Sciences
  - o Family Medicine
  - o Artificial Intelligence (Innovation)
  - o Integrated Undergraduate Research Curriculum (IUGRC)
  - o Enterpeneurship
  - o Digital Literacy Module
  - o Early Clinical Exposure (ECE)

#### **Introduction to Integrated University Spiral Courses**

#### **The Holy Quran Translation**

A course of Islamic Studies provides students with a comprehensive overview of the fundamental aspects of Islam, its history, beliefs, practices, and influence on society and familiarize students with a solid foundation in understanding the religion of Islam from an academic and cultural perspective. Ethics, in integrated form will shape the core of the course to foster among students the universal ethical values promoted by Islam

#### **Bioethics**

Biomedical ethics, also known as bioethics, is a field of study that addresses the ethical, social, and legal issues arising from medicine and the life sciences. It applies moral principles and decision-making frameworks to the practice of clinical medicine, biomedical research, and health policy. Biomedical ethics seeks to navigate the complex ethical dilemmas posed by advances in medical technology, research methodologies, and healthcare practices. Key areas of focus include patient rights and autonomy, confidentiality, informed consent, end-of-life care, resource allocation, and the ethics of genetic engineering, among others.

Biomedical ethics within medical universities plays a pivotal role in shaping the moral framework through which future healthcare professionals navigate the complex and often challenging decisions they will face in their careers. This critical discipline integrates ethical theories and principles with clinical practice, research, and healthcare policy, fostering a deep understanding of the ethical dimensions of medicine. By embedding biomedical ethics into the curriculum, Rawalpindi medical university equips students with the tools to critically analyze and address ethical dilemmas, ranging from patient confidentiality and informed consent to end-of-life care and the equitable distribution of healthcare resources.

This education goes beyond theoretical knowledge, encouraging students to apply ethical reasoning in practical scenarios, thus preparing them for the moral complexities of the medical field. Biomedical ethics also promotes a culture of empathy, respect, and integrity, ensuring that future medical practitioners not only excel in their technical skills but also uphold the highest ethical standards in patient care and research. Through seminars, case studies, and interdisciplinary collaborations, students are encouraged to engage in ethical discourse, reflecting on the societal impact of medical advancements and the responsibility of medical professionals to society. This foundational aspect of medical education cultivates a generation of healthcare professionals committed to ethical excellence, patient advocacy, and the pursuit of equitable healthcare for all.

#### **Professionalism**

Professionalism in medicine refers to the set of values, behaviors, and relationships that underpin the trust the public has in doctors and other healthcare professionals. It encompasses a commitment to competence, integrity, ethical conduct, accountability, and putting the interests of patients above one's own. Professionalism involves adhering to high standards of practice, including maintaining patient confidentiality, communicating effectively and respectfully with patients and colleagues, and continually engaging in self-improvement and professional development. It also includes a responsibility to improve access to high-quality healthcare and to contribute to the welfare of the community and the betterment of public health. In essence, professionalism in medicine is foundational to the quality of care provided to patients and is critical for maintaining the trust that is essential for the doctor-patient relationship.

Rawalpindi Medical University emphasizes the importance of professionalism in medicine, integrating it throughout its curriculum to ensure that students embody the core values of respect, accountability, and compassion in their interactions with patients, colleagues, and the community. This focus on professionalism is designed to prepare students for the complexities of the healthcare environment, instilling in them a deep sense of responsibility to their patients, adherence to ethical principles, and a commitment to continuous learning and improvement. Through a combination of theoretical learning, practical training, and mentorship, RMU encourages its students to exemplify professionalism in every aspect of their medical practice. Workshops, seminars, and clinical rotations further reinforce these values, providing students with real-world experiences that highlight the importance of maintaining professional conduct in challenging situations. RMU's approach to professionalism not only shapes competent and ethical medical professionals but also contributes to the broader mission of improving healthcare standards and patient outcomes. By prioritizing professionalism, Rawalpindi Medical University plays a crucial role in advancing the medical profession and ensuring that its graduates are well-equipped to meet the demands of a rapidly evolving healthcare landscape with honor and integrity.

#### **Communication Skills**

Communication skill for health professionals involves the ability to effectively convey and receive information, thoughts, and feelings with patients, their families, and other healthcare professionals. It encompasses a range of competencies including active listening, clear and compassionate verbal and non-verbal expression, empathy, the ability to explain medical conditions and treatments in an understandable way, and the skill to negotiate and resolve conflicts. Effective communication is essential for establishing trust, ensuring patient understanding and compliance with treatment plans, making informed decisions, and providing holistic care. It directly impacts patient satisfaction, health outcomes, and the overall efficiency of healthcare delivery

At Rawalpindi Medical University (RMU), the development of communication skills is regarded as a fundamental aspect of medical education, recognizing its critical importance in enhancing patient care, teamwork, and interdisciplinary collaboration. RMU is dedicated to equipping its students with exceptional communication abilities, enabling them to effectively interact with patients, their families, and healthcare colleagues. The curriculum is thoughtfully designed to incorporate various interactive and experiential learning opportunities, such as role-playing, patient interviews, and group discussions, which allow students to practice and refine their communication skills in a supportive environment.

By integrating communication skills training throughout its programs, RMU not only enhances the interpersonal competencies of its future healthcare professionals but also contributes to improving the overall quality of healthcare delivery. Graduates from RMU are distinguished not just by their clinical expertise but also by their ability to connect with patients and colleagues, making them highly effective and compassionate practitioners.

#### **Behavioral Sceinces**

Behavioral sciences in medicine focus on understanding and addressing the psychological and social aspects of health and illness. This interdisciplinary field combines insights from psychology, sociology, anthropology, and other disciplines to enhance medical care and patient outcomes. It explores how behavior, emotions, and social factors influence health, disease, and medical treatment. By incorporating behavioral science principles into medical practice, healthcare professionals can better understand patients' perspectives, improve communication, and promote positive health behaviors, ultimately contributing to more comprehensive and effective patient care.

#### **Family Medicine**

Family medicine is a medical specialty dedicated to providing comprehensive health care for people of all ages and genders. It is characterized by a long-term, patient-centered approach, building sustained relationships with patients and offering continuous care across all stages of life. It focuses on treating the whole person within the context of the family and the community, emphasizing preventive care, disease management, and health promotion.

The Family Medicine Curriculum at Rawalpindi Medical University (RMU) marks a significant stride towards holistic healthcare education, aiming to prepare medical graduates for the comprehensive and evolving needs of family practice. This curriculum is designed to offer a broad perspective on healthcare, focusing on preventive care, chronic disease management, community health, and the treatment of acute conditions across all ages, genders, and diseases. Emphasizing a patient-centered approach, the curriculum ensures that students develop a deep understanding of the importance of continuity of care, patient advocacy, and the ability to work within diverse community settings.

RMU's Family Medicine Curriculum integrates theoretical knowledge with practical experience. Students are exposed to a variety of learning environments, including community health centers, outpatient clinics, and inpatient settings, providing them with a well-rounded understanding of the different facets of family medicine. This hands-on approach is complemented by interactive sessions, workshops, and seminars that cover a wide range of topics from behavioral health to geriatric care, ensuring students are well-equipped to address the comprehensive health needs of individuals and families.

#### **Artificial Intelligence**

To realize the dreams and impact of AI requires autonomous systems that learn to make good decisions. Reinforcement learning is one powerful paradigm for doing so, and it is relevant to an enormous range of tasks, including robotics, game playing, consumer modeling and healthcare. This class will provide a solid introduction to the field of reinforcement learning and students will learn about the core challenges and approaches, including generalization and exploration. Through a combination of lectures, and written and coding assignments, students will become well versed in key ideas and techniques for RL. Assignments will include the basics of reinforcement learning as well as deep reinforcement learning — an extremely promising new area that combines deep learning techniques with reinforcement learning. In addition, students will advance their understanding and the field of RL through a final project.

#### **Integrated Undergraduate Research Curriculum**

The integrated undergraduate research curriculum (IUGRC) of RMU occupies a definite space in schedule of each of the five years in rational and incremental way. It has horizontal harmonization as well as multidisciplinary research work potentials. In the first-year teachings are more introductory & inspirational rather than instructional. The teachings explain what & why of research and what capacities are minimally required to comprehend research & undertake research. Some research dignitaries' lecture are specifically arranged for sharing their experiences and inspiring the students. Students are specifically assessed through their individual compulsory written feedback (reflection) after the scheduled teachings end.

#### Entrepreneurship

Entrepreneurship is the process of designing, launching, and running a new business, which typically starts as a small enterprise offering a product, process, or service for sale or hire. It involves identifying a market opportunity, gathering resources, developing a business plan, and managing the business's operations, growth, and development.

Entrepreneurship in medical universities represents a burgeoning field where the innovative spirit intersects with healthcare to forge advancements that can transform patient care, medical education, and healthcare delivery. This unique amalgamation of medical expertise and entrepreneurial acumen empowers students, faculty, and alumni to develop groundbreaking medical technologies, healthcare solutions, and startups that address critical challenges in the health sector. By integrating entrepreneurship into the curriculum, Rawalpindi Medical university is not only expanding the traditional scope of medical education but also fostering a culture of innovation and problem-solving. This enables future healthcare professionals to not only excel in clinical skills but also in business strategies, leadership, and innovation management.

Such initiatives often lead to the creation of medical devices, digital health platforms, and therapeutic solutions that can significantly improve patient outcomes and make healthcare more accessible and efficient. Through incubators, accelerators, and partnerships with the industry, medical universities are becoming hotbeds for healthcare innovation, driving economic growth, and contributing to the broader ecosystem of medical research and entrepreneurial success.

#### **Digital Literacy Module**

Digital literacy means having the skills one needs to live, learn, and work in a society where communication and access to information is increasingly through digital technologies like internet platforms, social media, and mobile devices.

#### **Early Clinical Exposure (ECE)**

Early clinical exposure helps students understand the relevance of their preclinical studies by providing real-world contexts. This can enhance motivation and engagement by showing students the practical application of their theoretical knowledge. Early exposure allows students to begin developing essential clinical skills from the start of their education. This includes not only technical skills but also crucial soft skills such as communication, empathy, and professionalism. Direct interaction with patients early in their education helps students appreciate the complexities of patient care, including the psychological and social aspects of illness. Early exposure to various specialties can aid students in making informed decisions about their future career paths within medicine.

Early clinical experiences contribute to the development of a professional identity, helping students see themselves as future physicians and understand the responsibilities and ethics associated with the profession. This can help reduce the anxiety associated with clinical work by familiarizing students with the clinical environment. It can build confidence in their abilities to interact with patients and healthcare professionals. Engaging with real-life clinical situations early on encourages the development of critical thinking and problem-solving skills, which are essential for medical practice. It helps bridge the gap between theoretical knowledge and practical application, leading to a more integrated and holistic approach to medical education. It allows students to observe and understand how healthcare systems operate, including the challenges and limitations faced in different settings.: Early patient interaction emphasizes the importance of patient-centered care from the outset, underscoring the importance of treating patients as individuals with unique needs and backgrounds.

Practical experiences can enhance long-term retention of knowledge as students are able to connect theoretical learning with clinical experiences.: Early clinical experiences often involve working in multidisciplinary teams, which fosters a sense of collaboration and understanding of different roles within healthcare.

In summary, early clinical exposure in medical education is pivotal for the holistic development of medical students, providing them with a strong foundation of practical skills, professional attitudes, and a deep understanding of patient-centered care.

#### The Holy Quran Translation lecture

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to Quran Translation	Understand and apply ethical considerations in Quranic translation.	C2	LGIS	SAQ
Islam and medical sciences	Co-relate Islamic concepts given in various verses of The Holy Quran with Medical Sciences	C2	LGIS	SAQ

#### **Biomedical Ethics & Professionlism**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Introduction to History of Medical Ethics	<ul> <li>To appraise the historical perspective of Hippocratic oath</li> <li>Understanding the beginnings of contemprory bioethics to address ethical dilemmas</li> </ul>	C2 C2	LGIS	MCQs

#### **Behavioral Sciences**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Introduction to	To describe Holistic and Traditional Allopathic	C1		
Behavioral	medicine.		LGIS	MCQs
Sciences				

Management of	• Define the types of stress, its causes and management	C1	
stress	of stress		

### **Family Medicine**

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to Family Medicine & its application in health care system	<ul> <li>Describe presenting complaints of patients with body aches</li> <li>Disscus complications of body aches</li> <li>Descirbe intial treatment of patients with body aches</li> </ul>	C3	LGIS-1	MCQs
system	<ul> <li>Know when to refer patient to consultant/ Hospital</li> </ul>			

### **Artificial Intelligence (Innovation)**

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to Artificial Intelligence	<ul> <li>Discuss fractures of upper limb with their clinical significance.</li> <li>Discuss role of artificial intelligence in interpretation of radiographs</li> </ul>	C2	LGIS	MCQS

### **Integrated Undergraduate Research Curriculum (IUGRC)**

Topic	Learning Objectives	Learning	Teaching	Assessment	
	At the end of the lecture the student should be able to	Domain	Strategy	Tool	
	Theoretical Lecture Based Teachings				
	Define Community Medicine, public health, preventive medicine	C1			
	Differentiate Community medicine and preventive medicine	C2			
	Elaborate evolution of preventive medicine/public health	C2			

	Discuss role of public health in prevention of diseases	C2		
Introduction to	Discuss importance of public health	C2		
Community				
Medicine	Define Health December 0 Comment of Health manners broadle de	C1		
Introduction to	Define Health Research & Concept of Health research methods.  It is a second of the second of t		_	
Health Research	Understand background and value of research in health & human development    Column   Co	C2	4	
process and	Elaborate Fundamental types and fields of health research covering;	C2	_	
researcher	- Basic & Applied Research	C2		
(Research-I)	<ul><li>Quantitative &amp; Qualitative Research</li><li>Collaborative &amp; Multidisciplinary research</li></ul>			
	- Health Research triangle			
	Conceptualize the drivers of research Including;	C2	LGIS-1	MCQs
		<b>62</b>		
	- Curiosity - Health needs			
	- Opportunity Profit			
	Describe meanings of HR & HRM			
	Appreciate role of HR in healthcare practices and human development	C2	1	
	Differentiate among various types and fields of HR	C2	-	
	Explain different drivers of HR	C2	1	
	Explain meanings of various characteristics of health research process so as to	C2		
Characteristics of	Differentiate research activity from non-research activity.	C2		
research and health research methods	Elaborate ingredients of researcher	C2	LGIS-2	MCQs
(Research-II)	Appreciate the importance of commands in certain pre-requisite subjects & skills before undertaking a research study.	C2		Weys
	Define Health Research	C1	1	
	Discuss the criteria for selection of a research topic	C2		
	Elaborate the types of variable	C2	1	
	Differentiate between qualitative and quantitative data	C2	1	
	Appreciate value of ethics in conduct of Health Research.	C2		
Basics of Ethics in Health Research	Explain basic ethical principles of health research.	C2		
	Interpret the application of data collection ethics	C2		
(Research-III)	Explain ethics of research methods	C2		
	Narrate responsibility for ethics in HR.	C2	LGIS-3	MCQs

D : CE4:	Explain Nuremburg code and importance of ethics in current research trends.	C2		
Basics of Ethics in Health Research (Research-IV)	<ul> <li>Elaborate General ethical principles including explanation of 04 basic principles of Beneficence, non-maleficence, respect and justice</li> </ul>	C2		
Five steps of EBM	Discuss Five steps of EBM	C2	LGIS-3	MCQs

# Enterpreneurship

Topics	Brief Note	Learning Outcomes
Ideate Initial Idea	How it would create value	Understand the concept of ideation in the entrepreneurial context.  Learn techniques for generating creative and innovative business ideas.  Develop skills to evaluate and refine initial ideas for feasibility and viability.

# **Digital Literacy Module**

Topic	Learning Objectives	Teaching	Assessment
	At the end of the lecture the student should be able to	Strategy	Tool
RMU Goes digital	<ul> <li>Introduction to LMS, CMS and MS Teams.</li> <li>Inrtorduction to RMU website</li> <li>How to use HEC digital library</li> <li>How to use up to date website</li> </ul>	LGIS	MCQs

### **List of Foundation Module Spiral Courses Lectures**

Sr. No	Date/Day	Department	Time	Topic of Lectures	Teachers Name & Contact #
1	12-02-24 Monday	Family Medicine & Community Medicine	12:20 PM – 01:00 PM	Research Model Of RMU, Biomedical Ethics, Family Medicine, Artificial Intelligence	Dr. Sadia Khan 0343-8509230 Dr. Khula Noreen 0333-5386482
2	12-02-24 Monday	IT Department	01:00 PM – 2:00 PM	Introduction to Digital Services RMU	Hafiz Shahid Rasool (Director IT)
3	16-02-24 Friday	Islam And Medical Sciences/ Quran Translation	8.00 AM – 9.00 AM	Islam & medical science (Mulana AbdulWAhid) Introduction to Quran translation	Mufti Naeem Shairazi 0300-5580299 Mulana Abdul Wahid Abassi 0341-5444667
4	16-02-24 Friday	DME	10:00 AM – 11:00 AM	Leadership Professionalism: Dr. Arsalan Introduction to Medical Ethics: Dr. Sidra	Dr. Sidra Hamid 0331-5025147 Dr. Arsalan Mughal 0334-3911629
5	17-02-2024 Saturday	DME	10:00 AM – 11:00 AM	Leadership Professionalism: Dr. Arsalan Intriduction to medical ethicsDr. Sidra Hamid	Dr. Sidra Hamid 0331-5025147 Dr. Arsalan Mughal 0334-3911629
6	19-02-2024 Monday	DME	10:00 AM – 11:50 AM	Entrepreneurship	Dr. Asif
7	23-02-24 Friday	Islam and medical sciences	09:00 AM – 10:00 AM	Introduction to Quran Translation Islam and medical sciences	Mufti Naeem Shairazi 0300-5580299 Mulana Abdul Wahid Abassi 0341-5444667



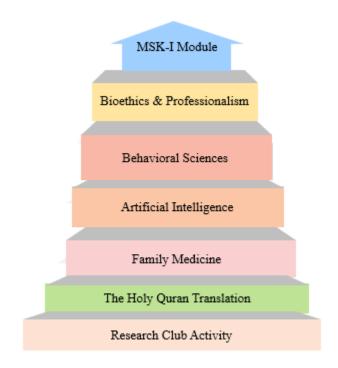
# Musculoskeletal -I Module



### **Integration of Disciplines in Musculoskeletal-I Module**



### **Spiral / General Education Cluster Courses**



# **Discipline Wise Details of Modular Content**

Block	Module	<b>General Anatomy</b>	Embryology	Histology	Gross Anatomy	
	• Anatomy	<ul><li>Skeletal System</li><li>Bones</li><li>Joints</li></ul>	General Embryology Second Week of Human Development till Placenta & Fetal Membranes	General Histology  Connective Tissue Cartilage Bone	Shoulder joint till Hand	
	Biochemistry     Minerals, Vitamins (A, D, E, ascorbic acid, thiamin and niacin), Introduction & Classification of Amino Acids					
<ul> <li>Physiology</li> <li>Physiology</li> <li>Drugs Acting On NMJ, Myasthenia Gravis, Lambart Eaton Syndrome</li> <li>Structure of Neurons. Classification of Neurons &amp; Nerve Fibers</li> <li>Nernst Potential, RMP</li> <li>Recording &amp; Propagation of Action Potential &amp; Factors Effecting Nerve Conduction &amp; Hyperpolarized State</li> <li>Stimulus &amp; Response &amp; Types of Stimuli, Stages of Action Potential</li> </ul>						
		•	S	piral Courses		
I	<ul><li>The Holy Quran Translation</li></ul>	• Imaniat				
_	<ul> <li>Seerat Mubarak</li> </ul>	The Significance	of Seerah Studies			
1	<ul><li>Bioethics &amp; Professionalism</li></ul>	Islamic concept o	f Bioethics			
	<ul> <li>Research Club Activity</li> </ul>	Comprehend their	r role in under "theme and s	cheme"		
	<ul> <li>Family Medicine</li> </ul>	<ul> <li>Approach to a pat</li> </ul>	ient with Body aches			
,	<ul> <li>Artificial Intelligence/Radiology</li> </ul>	• Interpretation of u	upper limb Radiograph & us	e of AI		
	<ul> <li>Vertical components</li> </ul>	• The Holy Quran	Translation Component			
-			Ver	tical Integration		
	<ul> <li>Clinically content relevant</li> <li>Shoulder Dislocation (Sur</li> <li>Tennis elbow, Fracture of</li> <li>Osteoporosis (Medicine)</li> <li>Osteomalacia, Rickets &amp;</li> </ul>	rgery) Tolecranon, Radius and U Polyarthritis (Medicine)				
	<b>1</b> , , , , , , , , , , , , , , , , , , ,	•	Early Clinica	l Exposure (ECE)		

	How to Read Bone X- ray.
	How to find Bone age
Clinical Rotations	• Fractures of distal Bones
	Placental abnormalities
	Uterine abnormalities
	Pregnancy and effects of congenital uterine abnormalities
	• X-ray in pediatric age group
	Pathologies like Rickets, congenital dislocation of hip joint and other abnormalities
	Clinical Themes
Accidents	
<ul> <li>Osteoporosis</li> </ul>	

### **MSK-I Module Team**

Module Name : MSK-I Module

Duration of module : 05 Weeks

Coordinator : Dr. Maria Tasleem

Co-coordinator : Dr. Gaiti Ara

Reviewed by : Module Committee

	Module Committee			Module Task Force Team			
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	. Coordinator	Dr. Maria Tasleem (Assistant Professor of Anatomy)		
2.	Chairperson Anatomy & Dean	Prof. Dr. Ayesha Yousaf	2.	DME Focal Person	Dr. Farzana Fatima		
	Basic Sciences						
3.	Director DME	Prof. Dr. Ifra Saeed	3.	. Co-coordinator	Dr. Gaiti Ara (Senior Demonstrator of Anatomy)		
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	. Co-Coordinator	Dr. Fahd Anwar (Demonstrator of Physiology)		
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	. Co-coordinator	Dr. Romessa Naeem (Demonstrator of Biochemistry)		
6.	Focal Person Anatomy First Year						
	MBBS	Asso. Prof. Dr. Mohtashim Hina					
7.	Focal Person Physiology	Dr. Sidra Hamid	DME Implementation Team				
			1.	. Director DME	Prof. Dr. Ifra Saeed		
8.	Focal Person Biochemistry	Dr. Aneela Jamil	2.	. Assistant Director DME	Dr. Farzana Fatima		
9.	Focal Person Pharmacology	Dr. Zunera Hakim	3.	. Implementation Incharge 1st & 2 <sup>nd</sup>	Prof. Dr. Ifra Saeed		
				Year MBBS	Dr. Farzana Fatima		
10.	Focal Person Pathology	Dr. Asiya Niazi	4.	. Editor	Muhammad Arslan Aslam		
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir					
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom					
13.	Focal Person Quran Translation	Dr. Fahad Anwar					
	Lectures						
14.	Focal Person Family Medicine	Dr. Sadia Khan					

#### Module II-MSK-I Module

**Rationale:** This module deals with locomotor system. This module describes the structural organization, functions, and congenital anomalies of musculoskeletal system. It explains the mechanism of neuromuscular transmission, its biochemical basis and the importance of Ca++ in the body. It depicts structure and function of joints in upper and lower limb. It elaborates identification of common fractures of long bones on radiograph.

#### Module Outcomes

At the end of this module the student should be able to:

#### Knowledge

- Explain the development & structure of musculoskeletal system.
- Explain the physiological and biochemical factors affecting Neuro Muscular transmission.
- Apply the knowledge of the basic sciences to understand common fractures.
- Appreciate concepts & importance of

**Artificial Intelligence** 

**Family Medicine** 

**Biomedical Ethics** 

Research.

#### **Skills**

- Dissect limbs to demonstrate regional Anatomy and relationships of various structures to each other.
- Identify histological features of connective tissue and muscles under microscope.
- Perform practicals on estimation of calcium and protein chemistry.

#### **Attitude**

• Demonstrate a professional attitude, team building spirit, good communication skills and cadaveric handling.

This module will run in 5 weeks duration. Instructional strategies are given in the time table and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self-Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



# **Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)**

# **Anatomy Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	C/P/A	Teaching	Assessmen
	At the end of session students should be able to		Strategy	t Tool
	Embryology			
	Describe formation of Amniotic Cavity, embryonic disc and Umbilical vesicle	C2		
Formation of Bilaminar	Discuss development of chorionic sac	C2	=	SAQs
	Outline the process of implantation	C1	• LGIS	MCQs
Embryonic Disc	Describe changes in Gravid Endometrium	C2	LOIS	VIVA
(2 <sup>nd*</sup> week of Human	Understand the Bio-physiological aspects of gravid endometrium	C2		VOCE
Development)	Corelate with the clinical conditions	C3	-	
· · · · · · · · · · · · · · · · · ·	focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3	-	
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3	-	
	Discuss process of gastrulation with special reference to primitive streak	C2		
Gastrulation	Describe the fate of primitive streak	C2		
Establishment of	Discuss establishment of body axis	C2	-	SAQs
Body Axis and	Draw fate map and discuss its importance in future development	C2	• LGIS	MCQs
Fate Map (3 <sup>rd</sup>	Understand the Biophysiological aspects of gastrulation	C2	-	VIVA
week)	Describe congenital abnormalities associated with gastrulation	C3		VOCE
	Corelate with the clinical conditions	C3		
	focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a relevant Research article	C3	-	
	Define notochord	C1		
Notochord Formation	Delineate different stages of notochord formation	C1		
FOIMAUON	Discuss the importance of notochord in development of central nervous system	C2	• LGIS	SAQs MCQs
(3 <sup>rd</sup> week)	Describe role of notochord in development of axial Skeleton	C1	-	

	Describe the fate of notochord	C2		VIVA
	Correlate with clinical conditions of notochord formation	C3	1	VOCE
	focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3	-	
	read relevant research article	C3	-	
	Define neurulation	C1		
	Describe formation of neural plate and neural tube	C2	-	SAQs
	Discuss neural crest formation	C2		MCQs
	Enlist derivatives of neural crest cells	C1	• LGIS	VIVA
Neurulation	Understand the bio-physiological aspects of Neurulation	C2		VOCE
(3 <sup>rd</sup> week)	Discuss neural tube defects	C3		
	Discuss different types of spina bifida	C3		
	Discuss the importance of folic acid in the prevention of spina bifida	C2	-	
	Corelate with the clinical conditions	C3		
	focus on provision of curative and preventive health care measures	C3	]	
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		
	Enumerate three germ layers and their derivatives	C1		
Development and	Describe different divisions of mesoderm	C2		SAQs
Differentiation of	Describe development of somites and their differentiation	C2	• LGIS	MCQs
Somites	Explain different stages of somite development	C2		VIVA
	Understand the Biophysiological aspects of Somite differentiation	C2		VOCE
	Correlate clinical aspects of somite differentiation	C3		
	Focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Describe early development of cardiovascular system and chorionic villi	C2		
Early Development	Discuss development of intraembryonic coelom	C2		SAQs
of Cardiovascular	Define angiogenesis and vasculogenesis.	C1	• LGIS	MCQs
System &	Correlate clinical aspects of angiogenesis	C3		VIVA
highlights of 4th- 8th week	Summarize the main developmental events and changes in external form of the	C2		
oui week	embryo during the 4th to 8th weeks			

	Corelate with the clinical conditions	C3		
	focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		
	Enlist different phases of embryonic development	C1		
	Describe folding of the embryo in median plane	C2		
Folding of Embryo	Describe folding of the embryo in horizontal plane	C2		
	Discuss results of folding	C2		
	Discuss Omphalocele and Gastroschisis	C3	• LGIS	SAQs
	Corelate with the clinical conditions	C3	• LGIS	MCQs VIVA
	focus on provision of curative and preventive health care measures	C3		VOCE
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		
	Describe different criteria for fetal age estimation	C2		
	Discuss the trimesters of pregnancy with their importance	C2		SAQs
	Describe highlights of fetal period	C2		MCQs
Estal mariad	Differentiate between embryonic and fetal period	C2	• LGIS	VIVA
Fetal period	Tabulate growth in length and weight during fetal period	C2		VOCE
	Enumerate and discuss factors influencing fetal growth	C2		
	Define the term perinatology	C1		
	Enlist and briefly describe procedures for assessing fetal well-being	C3		
	Correlate clinical aspects of fetal period	C3		
	focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		
Dloggata	Discuss Implantation and establishment of the embryo within the uterus	C2	1 010	- · ·
Placenta	Describe the differentiation of the uterine lining into decidua	C2	• LGIS	SAQs MCQs
	Describe the development of a placenta	C2		MICQS
	Describe fetal – maternal circulation	C2		

	Discuss the bio-physiological aspects of placenta	C2		VIVA
	Corelate the clinical conditions associated with placenta	C3	-	VOCE
	focus on provision of curative and preventive health care measures	C3	1	
	Practice principles of bioethics	C3	1	
	Apply strategic use of AI in health care	C3	1	
	read relevant research article	C3	1	
	Enlist membranes developing during pregnancy	C1		
	Discuss origin, composition, location, function and fate of yolk sac	C2	1	
Fetal Membranes	Explain origin, composition, location, function and fate of Amnion	C2		SAQs
and	Describe formation of umbilical cord and its structure	C2	• LGIS	MCQs
Multiple	Define Allantois along with its importance and function	C1		VIVA
Pregnancies	Discuss different types of twins	C2		VOCE
_	Correlate clinical aspects of fetal membranes	C3		
	Correlate with the clinical conditions of twin pregnancy	C3	1	
	focus on provision of curative and preventive health care measures	C3	1	
	Practice principles of bioethics	C3	1	
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		
	Histology			•
	Define connective tissue	C1		
C	Classify connective tissue	C2		
Connective tissue I Cells of connective	Enlist and explain types of cells in CT	C2		
tissue Embryonic	• Enumerate sites and describe the function of each type of cell of connective	C2	• LGIS	SAQs
connective tissue	tissue	C2	LOIS	MCQs
/ mucoid	Understand the Biophysiological aspects of connective tissue	C2	-	VIVA
Connective Tissue	<ul> <li>Draw and label histological structure of mucoid CT.</li> <li>Describe fibers in mucoid CT</li> </ul>	C2	-	VOCE
	Describe fibers in mucoid C1     Correlate clinical conditions of CT	C2	-	
		C3	-	
	focus on provision of curative and preventive health care measures      Drestige principles of hierarchies	C3	-	
	<ul> <li>Practice principles of bioethics</li> <li>Apply strategic use of AI in health care</li> </ul>	C3	-	
	Apply strategic use of Al in health care     read relevant research articles	C3	-	
Connective tissue II		C3		
Loose aerolar	Enumerate examples and location of reticular, connective tissue	C1 C2	4	CAO-
connective	Illustrate histological structure of loose and reticular connective tissue	C2	-	SAQs
Connective	Correlate clinical aspects of loose and reticular CT	LS		

tissue & its	• focus on provision of curative and preventive health care measures	C3	• LGIS	MCQs
types	Practice principles of bioethics	C3	]	VIVA
Reticular CT	Apply strategic use of AI in health care	C3		VOCE
	read relevant research article	C3		
	Enumerate examples and location of adipose and dense CT.	C1		
Connective tissue III Adipose CT Dense regular and	<ul> <li>Draw, describe and label histological structure of all types of connective tissue.</li> </ul>	C2	• LGIS	SAQs
	Differentiate between dense regular and irregular connective tissue microscopically	C2	Lois	MCQs VIVA VOCE
irregular connective	Correlate clinical aspects of loose and reticular CT	C3		VOCE
	focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		
	Classify cartilage	C2		
	Enlist sites of hyaline, fibro and elastic cartilage	C1		
	Appreciate microscopic structure of Hyaline, Elastic and Fibrocartilage	C2		SAQs
Cartilaga	Differentiate between three cartilages	C2	• LGIS	MCQs
Cartilage	Describe the structure of perichondrium	C2		VIVA
	Describe the arrangement of layers in articular cartilage	C2		VOCE
	Understand the Biophysiological aspects of cartilage	C2		
	Correlate with clinical conditions	C3		
	focus on provision of curative and preventive health care measures			
	Practice principles of bioethics	C3	]	
	Apply strategic use of AI in health care	C3	]	
	<ul> <li>Apply strategic use of AI in health care</li> <li>read relevant research article</li> </ul>	C3		
	Describe structure and functions of bone cells	C2		
	Discuss periosteum and endosteum	C2		
Bone-I	Discuss types of bones	C2		
(Cells & Types)	Describe the histological features of spongy and compact bone	C2		SAQs
	Describe structure of osteon.	C2	• LGIS	MCQs
	Understand the Biophysiological aspects of bone	C2		VIVA
	Correlate clinical aspects of bone	C3		VOCE
	focus on provision of curative and preventive health care measures	C3		

	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		
	Describe osteogenesis	C2		SAQs
Bone-II (Ossification)	Discuss bone growth, remodeling and repair	C2	• LGIS	MCQs VIVA
	• Describe histological changes in bones in osteoporosis, rickets, osteomalacia, osteopetrosis and bone tumors	C3		VOCE
	Correlate with the clinical conditions.	C3		
	• focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		

	General Anatomy			
Bone-I (General Features)	Describe the functions of bone and skeleton	C2	• LGIS	SAQs MCQs
	Identify general features of bone	C2		
	Differentiate between maceration and decalcification of bones	C2		
	Correlate with clinical conditions of bone	C3		VIVA
	focus on provision of curative and preventive health care measures	C3		VOCE
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		
	Classify bones based on different criteria	C2		
Bone-II Classification & Blood supply)	Describe the growing end hypothesis	C2	• LGIS	SAQs MCQs VIVA
	Describe blood supply of bones	C2		
	<ul> <li>Appreciate role of bones in estimation of sex, age and stature.</li> </ul>	C2		
	Correlate with the clinical conditions.	C3		VOCE
	focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		

	Define joints	C1		
	Classify fibrous joints with examples	C2		SAQs
Joints-I	Classify cartilaginous joints with examples	C2	• LGIS	MCQs
(Types)	<ul> <li>Classify synovial joints with examples</li> </ul>	C2		VIVA
	Understand the Bio-physiological aspects of joints	C2		VOCE
	Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	read relevant research article	C3		
	Describe structure of synovial joint	C2		
	Classify synovial joints	C2		
Joints-II	Explain movements around synovial joints	C2	• LGIS	SAQs
(Movements)	Enlist Degenerative joint diseases	C3		MCQs
	• Describe the involvement of anatomical structure of the articular cartilage in Degenerative joint disease	C3		VIVA VOCE
	Correlate with the clinical conditions.	C3		
	focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	• read relevant research article	C3		

## **Physiology Large Group Interactive Session (LGIS)**

Topic	Learning Objectives At the end of session students should be able to	C/P/A	Teaching Strategy	Assessment Tool
Structure of Neuron	Describe different parts of neuron	C1	LGIS SDL	SAQs MCQs VIVA
	Describe the classification of neurons and nerve fibers	C1		VOCE SAQs
Classification of Neurons and nerve fibers, NGF	Describe NGF; given their roles	C1	LGIS SDL	MCQs VIVA VOCE
	Define stimulus	C1		SAQs
Stimulus and Response & Types of Stimuli	Describe various types of stimuli and response	C1	LGIS	MCQs VIVA VOCE
Concept of degeneration and regeneration	Explain degeneration and regeneration of nerve fibers	C2	LGIS	SAQs MCQs VIVA VOCE
Properties of nerve fibers	Discuss the properties of nerve fibers	C2	LGIS	SAQs MCQs VIVA VOCE
	Define graded Potential with examples	C1		SAQs
Graded Potential, Comparison with action potential	Compare between graded potential and action potential	C2	LGIS	MCQs VIVA VOCE
Nernst Potential	• Understand the concept of Nernst potential and equilibrium potential for different ions	C2	LGIS	SAQs MCQs
RMP	Define resting membrane potential of nerves.	C1	SDL	VIVA
	Explain the factors which determine the level of RMP	C2		VOCE
	Differences between electrical and chemical synapse	C2		
RMP: & Measurement & effect of Electrolytes,	<ul> <li>Describe the terms polarized and hyperpolarized</li> <li>Describe the role of various ions for these states</li> </ul>	C1 C1	LGIS	SAQs MCQs

				VIVA VOCE
Stages of Action Potential I&II	<ul> <li>Define and draw action potential</li> <li>Describe different phases of action potential</li> </ul>	C1 C1	LGIS	SAQs MCQs VIVA VOCE
Recording of Action Potential Propagation of Action Potential & Factors effecting nerve conduction Polarization and hyperpolarization state	<ul> <li>Briefly describe the method of recording resting membrane potential and action potential</li> <li>Describe the mechanism of propagation of action potential</li> <li>Describe various factor that effect nerve conduction</li> </ul>	C1 C1	LGIS	SAQs MCQs VIVA VOCE
Refractory Period, Different types of Action Potentials	<ul> <li>Define refractory period and discuss its types</li> <li>Describe various types of action potential</li> </ul>	C1	LGIS SDL	SAQs MCQs VIVA VOCE
Synapse and synaptic transmission	Describe synapse and its types	C1	LGIS	SAQs MCQs VIVA VOCE
EPSP, IPSP, Properties of chemical synapse	Discuss in detail various properties of chemical synapse	C2	LGIS	SAQs MCQs VIVA VOCE
Properties of Chemical synaptic	Discuss in detail various properties of chemical synapse	C2	LGIS	SAQs MCQs VIVA VOCE
NMJ, Synthesis and release of Ach Excitation-Contraction coupling	<ul> <li>Describe the physiologic anatomy of neuromuscular junction.</li> <li>Recall Synthesis and release of Ach</li> <li>Describe the mechanism of transmission of impulses from nerve endings to skeletal muscle fibers</li> <li>Describe briefly the biochemistry of acetyl choline</li> </ul>	C1 C1 C1	LGIS SDL	SAQs MCQs VIVA VOCE

Drugs acting on NMJ, Excitation- Contraction coupling	<ul> <li>Enlist drugs that enhance and block transmission at neuromuscular junction</li> <li>Describe mechanism of excitation contraction coupling</li> </ul>	C1 C1	LGIS SDL	SAQs MCQs VIVA VOCE
Myasthenia Gravis, Lambert Eaton Syndrome	Describe the salient features of myasthenia gravis and Lambert Eaton syndrome	C1	LGIS	SAQs MCQs VIVA VOCE

## **Biochemistry Large Group Interactive Session (LGIS)**

Topic	Learning Objectives At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
	Minerals & Vitamins	2 0	Strategy	1001
Minerals classification and Introduction. Calcium Phosphate	<ul> <li>Classify Minerals</li> <li>State Daiy Requirements of Calcium in different conditions</li> <li>Discuss Types &amp; Sources of Calcium phosphate</li> </ul>	C1 C2 C2	LGIS	MCQs, SAQs & Viva
Biochemical Role of Calcium & Phosphate	<ul> <li>Discuss causes of Hypercalcemia &amp; Hypocalcemia</li> <li>Describe effects of Hypercalcemia &amp; Hypocalcemia</li> <li>State Daily Requirements of Phosphate</li> <li>Discuss Biochemical functions of Phosphate</li> </ul>	C2 C2	LGIS	MCQs, SAQs & Viva
Fluoride, Magnesium, Sulphur	<ul> <li>Elaborate Biochemical functions of Fluoride, Sulphur &amp; Magnesium</li> <li>Describe Deficiency Effects</li> </ul>	C2 C1	LGIS	MCQs, SAQs & Viva
Iodine, Copper, Zinc, Selenium, Manganese	<ul> <li>Recall sources &amp; daily requirements</li> <li>Discuss their biochemical functions</li> <li>Describe Deficiency Effects</li> </ul>	C1 C2	LGIS	MCQs, SAQs & Viva

Vitamins & Their Classification Vitamin A and E	<ul> <li>Classify Vitamins &amp; Water-Soluble Vitamins</li> <li>Enlist Sources of Vitamin A &amp; E</li> <li>Describe Biochemical functions of Vitamin A &amp; E</li> <li>Describe Deficiency Effects of Vitamin A &amp; E</li> <li>Explain Toxic Effects of Vitamin A</li> </ul>	C2 C1	LGIS	MCQs, SAQs & Viva
Vitamin D	<ul> <li>Enlist Sources of Vit.D</li> <li>Explain Steps of activation of Vit.D in the body</li> <li>Describe Biochemical functions of Vit.D</li> <li>Explain Deficiency effects of Vit.D</li> <li>Explain Toxic effects of Vit.D</li> </ul>	C1 C2	LGIS	MCQs, SAQs & Viva
Vitamin C	<ul> <li>Enlist Sources of Vit.C</li> <li>Describe Biochemical functions of Vit.C</li> <li>Explain Deficiency effects of Vit.C</li> <li>Explain Toxic effects of Vit.C</li> </ul>	C1 C2	LGIS	MCQs, SAQs & Viva
Niacin & Thiamine	<ul> <li>Enlist Sources</li> <li>Describe Biochemical functions</li> <li>Explain Deficiency effects</li> </ul>	C1 C2	LGIS	MCQs, SAQs & Viva
Classification & Structure of Amino Acids	Classification & Structure of Amino Acids & Isomerism of Amino Acids	C2	LGIS	MCQs, SAQs & Viva

## **Anatomy Small Group Discussion (SGDs)**

Topic	Learning Objectives	C/P/A	Teaching	Assessment
	At the end of Session students should be able to		Strategy	Tool
	Classify the joint (according to type, shape and movement)	C2		
	Discuss the attachments of capsule and ligament	C2		
	• Enlist the intra-articular structure (tendon of biceps brachii)	C1		
	Describe attachment of glenoidal labrum with its significance in relation to synovial membrane	C2		MCQs
	Discuss the neurovascular supply	C2		SEQs
Shoulder Joint	Discuss factors indispensable for stability of joint	C2	SGD,	VIVA VOCE
	Discuss the movements at shoulder joint	C2	Skill Lab	OSPE
	Enlist related bursae.	C1		
	• Explain the related clinicals ( shoulder dislocation, rotator cuff injuries, Glenoid Labrum tears, Frozen shoulder)	C3		
	Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	• Tabulate muscles of flexor compartment with their origin, insertion, nerve supply and actions	C2		
	Describe Neurovascular organization of arm.	C2		
Flexor compartment	• Map the outline of Brachial artery and Musculo cutaneous nerve in a simulated patient or model	P	SGD,	MCQs SEQs
& Neurovascular	• Correlate with the clinical conditions (biceps tendinitis, dislocation of tendon of biceps brachii)	C3	Skill Lab	VIVA VOCE OSPE
organization of	• focus on provision of curative and preventive health care measures	C3		
the arm	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a relevant research article	C3		
Extensor compartment	Tabulate Muscles of extensor compartment with origin insertion, nerve supply and actions	C2		MCQs
	Describe the neurovascular organization	C2	SGD,	SEQs
of the arm	• Discuss consequences of injury to radial nerve (wrist drop), venipuncture in cubital fossa)	C3	Skill Lab	VIVA VOCE OSPE

	Map the outline of Radial nerve and ulnar nerve on a simulated patient or model	P		
	Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Determine the side	C1		
	Demonstrate anatomical position	Р		MCQs
	• Discuss general features, attachments and articulations	C2	SGD,	SEQs
	Describe ossification	C2	Skill Lab	VIVA VOCE
Ulna	Elaborate interosseous membrane and its importance	C2		OSPE
Oma	Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	• Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
	• Determine the side	C1		
	Demonstrate its anatomical position	P		
	• Discuss general features, attachments and articulations	C2	SGD,	MCQs
Radius	• Describe its ossification	C2	Skill Lab	SEQs
	Describe the interosseous membrane and its importance	C2		VIVA VOCE
	Correlate the clinical conditions	C3		OSPE
	• focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
	• Tabulate muscles of flexor compartment with their origin, insertion, nerve supply and	C2		
Flexor	actions	02		MCQs
compartment	Correlate with clinical conditions associated with flexor compartment	C3	SGD,	SEQs
of the	• Map the outline of Median Nerve, Radial Artery and Ulnar Artery of forearm in a	P	Skill Lab	VIVA VOCE
forearm	simulated patient or Model			OSPE
	• focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		

	Read a relevant research article	C3		
	• Tabulate muscles of extensor compartment with origin, insertion, nerve supply and	C2		
Extensor	actions		SGD,	
compartment	• Correlate with clinical conditions associated with extensor compartment of forearm	C3	Skill Lab	MCQs
of the	(Tennis elbow)		_	SEQs
forearm	<ul> <li>focus on provision of curative and preventive health care measures</li> </ul>	C3	_	VIVA VOCE
	Practice principles of bioethics	C3	_	OSPE
	Apply strategic use of AI in health care	C3	_	
	Read a relevant research article	C3		
	• Describe nerves and vessels of forearm (formation, commencement, course, branches	C2		
Neurovascul	and relations)			MCQs
ar	<ul> <li>Correlate with associated clinical conditions (Median nerve injury, pronator</li> </ul>	C3	SGD,	SEQs
organization	syndrome, cubital tunnel syndrome)		SKILL LAB	VIVA VOCE
of forearm	<ul> <li>Map the outline of Radial Nerve and Ulnar Nerve on a simulated patient or model</li> </ul>	P		OSPE
	Correlate with the clinical conditions	C3		
	• focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3	-	
	Apply strategic use of AI in health care	C3	=	
	Read relevant research article	C3	=	
	Describe the type of joint with its articular surfaces	C2		
	Discuss the capsule, synovial membrane and ligaments of the joints	C2	=	MCQs
Elbow joint	• Enumerate the related bursae,	C1	SGD,	SEQs
J	Describe axis and plane of movements	C2	SKILL LAB	VIVA VOCE
	Enumerate muscles producing movements at elbow joint.	C1		OSPE
	Correlate with the associated clinical conditions (Elbow joint dislocation and	C3	<u>-</u>	
	student's elbow)			
	focus on provision of curative and preventive health care measures	C3	= 	
	Practice principles of bioethics	C3	<u>-</u>	
	Apply strategic use of AI in health care			
	Read a relevant research article	C3	_	
	Describe type of radioulnar joints, articular surfaces, capsular attachments,	C2		MCQs
Proximal and	synovial membrane and ligaments.	02	SGD,	SEQs
distal	Describe movements of supination and pronation with special reference to axes	C2	SKILL LAB	VIVA VOCE
radioulnar	• Enumerate the muscles producing these movements	C1		OSPE
joints	• Correlate clinical aspects of joint	C3	1	OSIL
Joints	• focus on provision of curative and preventive health care measures	C3	1	

	Practice principles of bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a relevant research article	C3		
	Understand the arrangement of carpal bones	C1		
	• Identify the salient features of carpel bone.	C2		
	Discuss the special blood supply of scaphoid bone.	C3		MCQs
Hand	Describe the mid carpal joint.	C2	SGD,	SEQs
Tuna	• Discuss the 1st carpometacarpal joint including the type of the joint capsule synovial	C2	SKILL LAB	VIVA VOCE
	membrane and ligaments with axis of the movement and the muscles producing the		SIGNED EXTE	OSPE
	movements			OSIL
	Correlate with the clinical conditions.	C3		
	• focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care			
	Read relevant research article	C3		
	Describe the type of joint with its articular surfaces	C2		
	Discuss the capsule, synovial membrane and ligaments of the joint	C2		
	Enumerate the related bursae	C1	1	MCQs
Wrist joint	Describe axis and plane of movements	C2	SGD,	SEQs
Wiist Joint	Enumerate muscles producing movements at joint	C1	SKILL LAB	VIVA VOCE
	Discuss wrist fractures & Dislocations	C3		OSPE
	Correlate with the clinical conditions	C3		
	focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a relevant research article			
Anastomosis	• Discuss the blood vessels involved in the formation of anastomosis around the wrist joint	C2		
around wrist	Explain the importance of anastomosis.	C2		MCQs
joint	Correlate with the clinical conditions	C3	SGD,	SEQs
John	• focus on provision of curative and preventive health care measures Able to focus on	C3	SKILL LAB	VIVA VOCE
	provision of curative and preventive health care measures		SKILL LIND	OSPE
	Practice principles of bioethics	C3	_	OSIL
	Apply strategic use of AI in health care	C3	_	
	• Read a relevant research article			
Dorsum of	Describe the muscles of dorsum of hand	C2	SGD,	
Hand, Flexor	Discuss the Dorsal digital expansion	C2	SKILL LAB	MCQs
nana, riexor	• Describe the attachment of flexor retinaculum with structures related to it.	C2		111000

retinaculum	• Map the outline of flexor and extensor retinacula on a simulated patient or a model.	P		SEQs
Extensor	Describe the Guyon's canal.	C2	]	VIVA VOCE
retinaculum	Describe the formation of the carpel tunnel and its applied anatomy.	C3		OSPE
	Describe the attachment of extensor retinaculum and its various compartments	C2		
	with structures passing through it.			
	• Discuss the De Quervain's disease.	C3		
	• Correlate with the clinical conditions.	C3		
	<ul> <li>focus on provision of curative and preventive health care measures</li> </ul>	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care			
	Read a relevant research article	C3		
	<ul> <li>Tabulate the muscles forming the thenar and hypothenar eminence.</li> </ul>	C2		
	• Discuss Lumbricals, Palmar and dorsal interossei with their attachments and	C2		
D 1 (1 1 1	actions.			MCQs
Palm of hand-I Muscles &	Discuss the formation of superficial and deep arterial arches	C2	SGD,	SEQs
Neurovascular	Map the outline of superficial and deep arterial arches on a simulated patient or	P	SKILL LAB	VIVA VOCE
organization	model.			OSPE
organization	Correlate with the clinical conditions.	C3		
	• focus on provision of curative and preventive health care measures	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3	]	
	Read a relevant research article	C3	]	
	• Discuss the formation and attachments of palmar aponeurosis.	C2		
	Describe the formation of palmar spaces and its divisions	C2		
	Describe the thenar and mid palmar spaces.	C2	]	MCQs
Palm of hand-	Define pulp spaces	C1	SGD,	SEQs
II Fascial	Relate anatomy of pulp space with its common clinical conditions	C3	SKILL LAB	VIVA VOCE
spaces of hand	Describe dorsal subcutaneous spaces	C2		OSPE
Grip	Demonstrate surgical incisions.	C3		
	Describe different types of grips	C2		
	Correlate with the clinical conditions.	C3		
	<ul> <li>focus on provision of curative and preventive health care measures</li> </ul>	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a relevant research article	C3		
	• Identify the structures present at different levels of cross section; mid humeral shaft,	C2		
	end of humeral shaft, elbow joint, superior radioulnar joint, mid forearm, wrist joint,			

Cross	proximal shafts of metacarpals.			
sectional	Correlate with the clinical conditions	C3	SGD,	MCQs
Anatomy	Read a relevant research article	C3	SKILL LAB	SEQs
of upper	Apply strategic use of AI in health care	C3		VIVA VOCE
limb				OSPE

### **Physiology Small Group Discussion (SGDs)**

Topic	Learning Objectives	C/P/A	Teaching	Assessment
	At the end of Session students should be able to		Strategy	Tool
Discussion regarding previous module	Discuss difficulties regarding questions, MCQs of Foundation Module	C2	SGD	MCQs SAQs Viva Voce
previous module				OSPE
	Define resting membrane potential of nerves.	C1		MCQs
RMP, measurement &	Explain the factors which determine the level of RMP		SGD	SAQs
effects, of electrolyte	Explain the factors which determine the level of Kivii	C2		Viva Voce
on RMP				OSPE
	Drugs acting on NMJ	C1		MCQs
Drugs acting on NMJ	Excitation contraction coupling			SEQs
excitation contraction		C1	SGD	SAQs
coupling				Viva Voce
C	D 11.	C1		OSPE
Synapse and synaptic transmission &	Describe synapse and its types	CI	-	MCQs
EBSP,IPSP properties	Differences between electrical and chemical synapse	C2	SGD	SAQs Viva Voce
of chemical synapse		C2	300	OSPE
or enemical synapse	Concept of Nernst potential	C1		MCQs
Nernst potential	Equilibrium potential for different ions	- 01	SGD	SAQs
	Equinorium potentiai for anterent ions	C2		Viva Voce
				OSPE
	Transmission Across NMJ	C1		MCQs
Neuro muscular function (NMJ)	Diseases of NMJ		SGD	SAQs
		C2		Viva Voce
				OSPE

	• Describe NGF	C1		MCQs
Nerve growth factor	Give their role	C1	SGD	SAQs
(NGF)	• Explain De-generation and Re-Generation of nerve fibers	C2		Viva Voce
				OSPE

## **Biochemistry Small Group Discussion (SGDs)**

Topic	Learning Objectives	Learning Domain	Teaching Strategy	Assessmen t Tools
Introduction and Classification of	Define Vitamins	C1	SGD	MCQ SAQ
Vitamins	Introduction & Classification of Vitamins	C1		VIVA
& Vitamin E	Discuss sources, functions and clinical significance of vitamin E.	C2		
			SGD	MCQ
Minerals	Discuss Sources, Functions and Clinical Significance Calcium,     Phosphate, Iodine, Fluoride, Copper, Zinc, Selenium, Magnesium,     Sulphur And Cobalt.	C2		SAQ VIVA

## **Anatomy Self Directed Learning (SDL)**

	Learning Resources
At the end of Session students should be able to	
• Classify the joint (according to type, shape and movement)	
1 0	
i '	
membrane	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8<sup>TH</sup> Edition.</li> </ul>
	(Chapter 3, Page 266- 271,284-
<ul> <li>Discuss factors indispensable for stability of joint</li> </ul>	285).
Discuss the movement sat shoulder joint	https://teachmeanatomy.info/upp
• Enlist related bursae.	er-limb/joints/shoulder
• Explain the related clinicals (shoulder dislocation, rotator cuff injuries, Glenoid Labrum tears, Frozen shoulder)	
• Tabulate muscles of flexor compartment with the irorigin, insertion, nerve supply and actions	
	Clinical Oriented Anatomy by
• Explain the related clinicals (biceps tendinitis, dislocation of tendon of biceps brachii)	Keith L. Moore.8 <sup>TH</sup> Edition. (Chapter 3, Page201-211,211-214). https://teachmeanatomy.info/upp er-limb/muscles/anterior- forearm/
• Tabulate Muscles of extends or compartment with origin insertion, nerve supply and actions	
Describe the neurovascular organization	Clinical Oriented Anatomy by     Keith L. Moore.8 <sup>TH</sup> Edition.
• Discuss consequences of injury to radial nerve (wrist drop), venipuncture in cubital fossa)	(Chapter 3, Page201-211,211-214).
Read relevant research article	(Chapter 3, 1 age 201 211,211 211).
• Use Digital Library	https://teachmeanatomy.info/upp er-limb/muscles/upper-arm/
• Determine the side	
•	Clinical Oriented Anatomy by
	Keith L. Moore.8 <sup>TH</sup> Edition.
	(Chapter 3, Page147).
• Elaborate interosseous membrane and its importance	https://teachmeanatomy.info/upp
Correlate the clinical aspects	er-limb/bones/ulna/
	<ul> <li>Discuss the attachments of capsule and ligament</li> <li>Enlist heintra-articular structure (tendon of biceps brachii)</li> <li>Describe attachment of glenoidal labrum with its significance in relation to synovial membrane</li> <li>Discuss the neurovascular supply</li> <li>Discuss the neurovascular supply</li> <li>Discuss the movement sat shoulder joint</li> <li>Enlist related bursae.</li> <li>Explain the related clinicals (shoulder dislocation, rotator cuff injuries, Glenoid Labrum tears, Frozen shoulder)</li> <li>Tabulate muscles of flexor compartment with the irorigin, insertion, nerve supply and actions</li> <li>Describe Neurovascular organization of arm,</li> <li>Explain the related clinicals (biceps tendinitis, dislocation of tendon of biceps brachii)</li> <li>Tabulate Muscles of extends or compartment with origin insertion, nerve supply and actions</li> <li>Describe the neurovascular organization</li> <li>Discuss consequences of injury to radial nerve (wrist drop), venipuncture in cubital fossa)</li> <li>Read relevant research article</li> <li>Use Digital Library</li> <li>Determine the side</li> <li>Demonstrate anatomical position</li> <li>Discuss general features, attachment sand articulations</li> <li>Describe ossification</li> <li>Elaborate interosseous membrane and its importance</li> </ul>

Radius	<ul> <li>Determine the side</li> <li>Demonstrate it anatomical position</li> <li>Discuss general features, attachments and articulations</li> <li>Describe its ossification</li> <li>Describe the interosseous membrane and its importance</li> <li>Correlate the clinical aspects</li> </ul>	Clinical Oriented Anatomy by     Keith L. Moore.8 <sup>TH</sup> Edition.     (Chapter 3, Page148).  https://teachmeanatomy.info/upp er-limb/bones/radius/
Flexor compartment of the forearm	<ul> <li>Tabulate muscles of flexor compartment with their origin, insertion, nerves Supply and actions</li> <li>Describe clinical conditions associated with flexor compartment</li> </ul>	Clinical Oriented Anatomy by     Keith L. Moore.8 <sup>TH</sup> Edition.     (Chapter 3, Page215-234,236,240)  https://teachmeanatomy.info/upper-limb/muscles/anterior-forearm/
Extensor compartment of the forearm	<ul> <li>Tabulate muscles of extensor compartment with origin, insertion, nerve supply and actions</li> <li>Describe clinical condition associated with extensor compartment of forearm (Tennis elbow)</li> </ul>	• Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 3, Page215-234,236,240).  https://teachmeanatomy.info/upper-limb/muscles/posterior-forearm/
Neurovascular organization of forearm	<ul> <li>Describe nerves and vessels of forearm (formation, commencement, course, branches and relations)</li> <li>Describe associated clinical conditions (Median nerve injury, pronator syndrome, cubital tunnel syndrome)</li> <li>Read relevant research article</li> <li>Use Digital Library</li> </ul>	Clinical Oriented Anatomy by     Keith L. Moore.8TH Edition.     (Chapter 3, Page215-234,236,240).      https://teachmeanatomy.info/upper-limb/muscles/posterior-forearm/
Elbow joint	<ul> <li>Describe the type of joint with its articular surfaces</li> <li>Discuss the capsule, synovial membrane and ligaments of the joints</li> <li>Enumerate the related bursae,</li> <li>Describe axis and plane of movements</li> <li>Enumerate muscles producing movements at elbow joint.</li> <li>Describe the associated clinical conditions (Elbow joint dislocation and student's elbow)</li> </ul>	Clinical Oriented Anatomy by     Keith L. Moore.8TH Edition     (Chapter 3, Page271-274).  https://www.kenhub.com/en/library/a     natomy/elbow-joint

	• Describe type of radioulnar joints, articular surfaces, capsular attachments, synovial membrane and ligaments.	Clinical Oriented Anatomy by Keith L. Moore.8TH Edition.
	Describe movements of supination and pronation with special reference to axes	(Chapter 3, Page274-277).
Proximal and distal		(Chapter 5, 1 age 27 1 277).
radioulnar joints	Encounte the manufacture the control of	https://www.kenhub.com/en/library
	• Enumerate the muscles producing these movements	/anatomy/proximal-radioulnar-joint
	Correlate clinical aspects of joint	https://www.kenhub.com/en/library
	Contract eninear aspects of joint	/anatomy/distal-radioulnar-joint
	Understand the arrangement of carpal bones	/anatomy/aistar radioamar joint
	• Identify the salient features of carpel bone.	Clinical Oriented Anatomy by
	Discuss the special blood supply of scaphoid bone.	Keith L. Moore.8TH Edition.
Hand	Describe the midcarpal joint.	Chapter 3, Page148-151,278-283).
	• Discuss the1st carpometacarpal joint including the type of the joint capsules ynovial	
	Membrane and ligaments with axis of the movement and the muscles producing the movements	https://teachmeanatomy.info/upper-
	Read relevant research article	limb/muscles/hand/
	• Use Digital Library	
	Describe the type of joint with its articular surfaces	
W/wist is int	• Discuss the capsule, synovial membrane and ligaments of the joint	<ul> <li>Clinical Oriented Anatomy by</li> </ul>
Wrist joint	Enumerate the related bursae	Keith L. Moore.8TH Edition.
	Describe axis and plane of movements	(Chapter 3, Page278).
	Enumerate muscles producing movements at joint	https://www.kenhub.com/en/library
	Discuss wrist fractures & Dislocations	/anatomy/the-wrist-joint
	• Discuss the blood vessels involved in the formation of anastomosis around the wrist joint	Clinical Oriented Anatomy by
	• Explain the importance of anastomosis.	Keith L. Moore.8TH Edition.
		(Chapter 3, Page278).
Anastomosis around		https://www.kenhub.com/en/library
wrist joint		/anatomy/arterial-anastomoses-of-
		the-upper-extremity
	Describe the muscles of dorsum of hand	
Dorsum of Hand,	Discuss the Dorsal digital expansion	
Flexor retinaculum	Describe the attachment of flexor retinaculum with structures related to it.	<ul> <li>Clinical Oriented Anatomy by</li> </ul>
Extensor retinaculum	Describe the Guyon's canal.	Keith L. Moore.8TH Edition.
	Describe the formation of the carpel tunnel and its applied anatomy.	(Chapter 3, Page159,224-226).
	Describe the attachment of extensor retinaculum and its various compartments with structures passing through it.	
	Structures passing unough it.	

	Discuss the De Quervain's disease.	https://teachmeanatomy.info/upper -limb/muscles/hand/
Palm of hand-I	Tabulate the muscles forming the thenar and hypothenar eminence.	
Muscles & Neurovascular	<ul> <li>Discuss Lumbricals, Palmar and dorsal interossei with their attachments and actions.</li> <li>Discuss the formation of superficial and deep arterial arches</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.8TH Edition.
organization	Discuss the formation of superficial and deep arterial arches     Discuss the clinicals associated with palm	(Chapter 3, Pag243-256).
		https://teachmeanatomy.info/upper -limb/muscles/hand/
	• Discuss the formation and attachments of palmar aponeurosis.	
Palm of hand-II	Describe the formation of palmar spaces and its divisions	<ul> <li>Clinical Oriented Anatomy by</li> </ul>
Fascial spaces of hand	• Describe the thenar and mid palmar spaces.	Keith L. Moore.8TH Edition.
Grip	Define pulp spaces	(Chapter 3, Page241-243,258-262).
	Relate anatomy of pulp space with its common clinical conditions	
	Describe dorsal subcutaneous spaces.	https://boneandspine.com/spaces-
	Demonstrate surgical incisions.	of-hand/
	Describe different types of grips	
	Read relevant research article	
	Use Digital Library	

## Physiology Self Directed Learning (SDL)

Topics	Learning Objective	References
Structure of neurons Classification of neurons & nerve fibers	<ul> <li>Structure of neurons</li> <li>Myelinate Dand unmyelinated nerve fibers.</li> <li>Neuroglia</li> <li>Difference between neurons and glial cells</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition physiology Excitable Tissue; Nerve (Chapter 04, Page 85-90)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup>Edition. Introduction to Physiology. (Unit2, Chapter 05 Membrane Physiology Page74)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 01. Physiology of Body Fluids. (Chapter 03, Page 37)</li> </ul>
Nernst potential, RMP	<ul> <li>Basic physics of membrane potential, Nernst equation,</li> <li>Goldman Equation</li> <li>Origin of RMP indifferent cell types.</li> </ul>	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Chapter no. 05 membrane dynamics Page no.188)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition Membrane Potential and action potential. (Unit 2,Chapter 05 Page 63)</li> <li>Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition, Excitable Tissue; Nerve (Chapter 04, Page 90)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 01. Properties and function of cell membrane. (Chapter 02, Page 31,41-43)</li> </ul>
Properties of nerve fibers	<ul> <li>Rhythmicity of Excitable tissues,</li> <li>Characteristics of signal transmission,</li> <li>Types of refract toy period</li> <li>Concept of excitation</li> </ul>	<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Membrane Potential and action potential (Unit2, Chapter 05, Page 73-76)</li> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition, Over view of cell physiology in medical physiology. Excite able Tissue; Nerve (Chapter04, Page 94)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section01. Property and function of cell membrane. (Chapter03, Page41,55)</li> </ul>
Measurement of RMP & effect of electrolytes on RMP	<ul> <li>Measurement of RMP</li> <li>Effect of electrolyte son RMP</li> <li>Role of Na/K pump</li> </ul>	<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition. Membrane Potential and action potential (Unit2, Chapter 05, Page 65,67-70)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup>Edition. Chapter no.05 Membrane dynamics Page no.188-194)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Cellular Physiology (Chapter01.Page18)</li> </ul>
Concept of degeneration & regeneration	<ul><li>Introduction</li><li>Axonal Degeneration</li><li>Wallerian Degeneration</li></ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition, overview of cell physiology in medical physiology (chapter 6, page 133)</li> <li>A &amp; P Anatomy and physiology Tortora, Chapter 12 Nervous tissue And Homeostasis Page 447</li> <li>Ganong's Review of Medical Physiology.25TH Edition, overview of cell physiology in medical physiology (Chapter 4, page 97)</li> </ul>

Stimulus & response & types of stimuli, Stages of action potential	<ul> <li>Neuron action potential,</li> <li>Stages of Propagation of AP</li> <li>Conduction Rates</li> <li>ALL-OR-NONE Principle</li> </ul>	<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Introduction to Physiology. (Unit 2, Chapter 05 Membrane Potential and action potential Page 71)</li> <li>Ganong's Review of Medical Physiology.25TH Edition, Excitable Tissue; Nerve (Chapter 04,Page 93)</li> <li>Physiology by Linda S. Costanzo 6thEdition. cellular Physiology (Chapter 01. Page 25)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. Section 01. Properties and function of cell membrane. (Chapter 03,Page 45,47-51)</li> </ul>
A, Refractory period, types of action potential. Graded potential comparison with action potential B. Recording & propagation of action potential & factors effecting nerve conduction & hyperpolarized state	<ul> <li>Threshold Potential</li> <li>Action potential</li> <li>Types of Action Potential</li> <li>Propagation of Action Potential</li> <li>Hyperpolarization</li> <li>Factors effecting Action potential</li> </ul>	<ul> <li>A.</li> <li>Ganong's Review of Medical Physiology.25TH Edition, General principles and Energy production in Medical Physiology (chapter 04, Page 90, 93)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Introduction to Physiology. (Chapter 5, page 67).</li> <li>Ganong's Review of Medical Physiology.25TH Edition, General principles and Energy production in Medical Physiology (chapter 8, page 273) <ul> <li>B.</li> </ul> </li> <li>Ganong's Review of Medical Physiology.25TH Editions, Overview of Cellular Physiology in Medical Physiology (chapter 08, Page 276, 278, 281)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Introduction to Physiology. (Section 1, chapter 04., page 71,72.73,74)</li> <li>Ganong's Review of Medical Physiology.25TH Editions, Overview of Cellular Physiology in Medical Physiology (chapter 04, page 93)</li> </ul>

## **Biochemistry Self Directed Learning (SDL)**

Topics	Learning Objective	References			
	Minerals & Vitamins				
Minerals Introduction Classification Calcium and phosphate	<ul> <li>State Daily Requirements of Calcium in different conditions</li> <li>State Daily Requirement of Phosphate in different condition</li> <li>Classify Minerals Discuss Types</li> <li>Sources of Calcium</li> <li>Sources of Phosphate</li> </ul>	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Edition Chapter # 29 page#466-467</li> <li>Textbook of Harper 32<sup>nd</sup> Edition Chapter # 44 page# 540</li> <li><a href="https://www.ncbi.nlm.nih.gov/books/NBK218735">https://www.ncbi.nlm.nih.gov/books/NBK218735</a></li> <li><a href="https://youtu.be/34FTvJZCrt4">https://youtu.be/34FTvJZCrt4</a></li> </ul>			
Biochemical Role of Calcium & Phosphate	<ul> <li>Discuss causes of Hypercalcemia</li> <li>Discuss causes of Hypocalcemia</li> <li>Describe effects of Hypercalcemia &amp; Hypocalcemia</li> <li>State Daily Requirements of Phosphate Discuss Biochemical functions of Phosphate</li> </ul>	Textbook of Lippincott 8 <sup>th</sup> Edition Chapter # 29 page #466-467  https://www.ncbi.nlm.nih.gov/books/NBK279023/  https://youtu.be/qAeWKCXDniw			
Fluoride, Magnesium, Sulphur	<ul> <li>Elaborate Biochemical functions of Fluoride, Sulphur &amp; Magnesium</li> <li>Enlist Sources of Fluoride, Sulphur.</li> <li>Magnesium Describe Deficiency Effects</li> </ul>	Textbook of Lippincott 8 <sup>th</sup> Edition Chapter # 29 page #468  https://www.ncbi.nlm.nih.gov/ https://youtu.be/PTOJNdtuXro			
Iodine, Copper, Zinc, Selenium, Manganese	<ul> <li>Recall sources &amp; daily requirements</li> <li>Discuss their biochemical functions Describe Deficiency Effects</li> </ul>	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Edition Chapter # 29 page #449-454</li> <li><a href="https://youtu.be/1i9fSQSvYI0">https://youtu.be/1i9fSQSvYI0</a></li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/">https://pubmed.ncbi.nlm.nih.gov/</a></li> </ul>			
Definition of Vitamins &Classification of Vitamins Vitamin A and E	<ul> <li>Classify Fat- &amp; Water-Soluble Vitamins</li> <li>Enlist Sources of Vitamin A &amp; E</li> <li>Describe Biochemical functions of Vitamin A &amp; E</li> <li>Describe Deficiency Effects of Vitamin A &amp; E</li> <li>Explain Toxic Effects of Vitamin A</li> </ul>	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Edition Chapter # 28 page #423,432-436,441,444</li> <li>Textbook of Harper 32<sup>nd</sup> Edition Chapter # 44 page# 528-529</li> <li><a href="https://byjus.com/chemistry">https://byjus.com/chemistry</a></li> <li><a href="https://youtu.be/7ZFr9xiAt94">https://youtu.be/7ZFr9xiAt94</a></li> </ul>			

Biochemical Role of Vitamin D	<ul> <li>Enlist Sources of Vit.D</li> <li>Explain Steps of activation of Vit.D in the body</li> <li>Describe Biochemical functions of Vit.D</li> <li>Explain Deficiency effects of Vit.D</li> <li>Explain Toxic effects of Vit.D</li> </ul>	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Edition Chapter # 28 page # 437-440</li> <li>Textbook of Harper 32<sup>nd</sup> Edition Chapter # 44 page# 530-532</li> <li><a href="https://byjus.com/chemistry">https://byjus.com/chemistry</a></li> <li><a href="https://youtu.be/6xhE5e16X0c">https://youtu.be/6xhE5e16X0c</a></li> </ul>
Deficiency Manifestation of Vitamin A and D	Explain Deficiency effects of vitamin A and D	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Edition Chapter # 28 Page #435,439</li> <li>Textbook of Harper 32<sup>nd</sup> Edition Chapter # 44 page# 530-532</li> <li><a href="https://www.ncbi.nlm.nih.gov/">https://www.ncbi.nlm.nih.gov/</a></li> <li>s<a href="https://youtu.be/ZCINiQX-mxU">shttps://youtu.be/ZCINiQX-mxU</a></li> </ul>
Deficiency manifestation of Thiamine	• Explain Deficiency effects	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Edition Chapter # 28 Page #429,430</li> <li>Textbook of Harper 32<sup>nd</sup> Edition Chapter # 44 page# 534</li> <li><a href="https://www.ncbi.nlm.nih.gov/">https://www.ncbi.nlm.nih.gov/</a></li> <li><a href="https://youtu.be/WAkXS8lgoA0">https://youtu.be/WAkXS8lgoA0</a></li> </ul>
Niacin and Thiamine Classification & Structure of Amino Acids	<ul> <li>Classification &amp; Structure of Amino Acids &amp; Isomerism of Amino Acids</li> <li>Enlist Sources Niacin and Thiamine</li> <li>Describe Biochemical functions Niacin and Thiamine</li> <li>Explain deficiency effects of Niacin and Thiamine</li> </ul>	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Edition Chapter # 28and 1 Page #1-5 &amp;429-431</li> <li>Textbook of Harper 32<sup>nd</sup> Edition Chapter # 44 page# 534-535</li> <li><a href="https://microbenotes.com/">https://microbenotes.com/</a></li> <li><a href="https://youtu.be/9pwBUTIcxHk">https://youtu.be/9pwBUTIcxHk</a></li> </ul>

## Histology Practical s Skill Laboratory (SKL)

Topic	At The End Of The Practical The Students Should Be Able To		Teaching Strategy	Assessment Tools
Connective Tissue-I	Identify mucoid connective tissue under microscope	P		
	Illustrate histological structure of mucoid connective tissue	C2		
<ul> <li>Embryonic</li> </ul>	Write two points of identification	C1		
connective tissue /	Identify reticular and adipose connective tissue under microscope	C2		
mucoid Connective	Illustrate histological structure of reticular and adipose connective tissue	C2		OSPE
Tissue	Write two points of identification	C1	Skill Lab	MCQs
<ul> <li>Loose areolar connective tissue</li> <li>Reticular Connective Tissue</li> <li>Adipose Connective Tissue</li> </ul>	• Focus the slide	Р		
Connective Tissue-II	Identify dense regular and irregular connective tissue under microscope	P		
	Illustrate histological structure of dense regular and irregular connective tissue	C2	•	
<ul> <li>Dense regular</li> </ul>	Write two points of identification	C1	Skill Lab	OSPE
connective tissue	Differentiate between dense regular and irregular connective tissue	C2		MCQs
• Dense irregular	microscopically			
connective tissue	Focus the slide	P		
	Identify all three types of cartilages under microscope	P		
<u>Cartilage</u>	Illustrate microscopic structure of all three cartilages	C2		
<ul> <li>Hyaline cartilage</li> </ul>	Discuss the structure of perichondrium	C1	Skill Lab	OSPE
Elastic cartilage	Write wo points of identification	C1		MCQs
<ul> <li>Fibrocartilage</li> </ul>	Enlist sites of hyaline, fibro and elastic cartilage	C1		
	Focus the slide	P		
	Identify compact and spongy bone under microscope	P		
<u>Bone</u>	Illustrate microscopic structure of compact bone and spongy bone	C2	Skill Lab	OSPE
<ul> <li>Compact Bone</li> </ul>	Write two points of identification	C1		MCQs
<ul> <li>Spongy Bone</li> </ul>	Focus the slide	P		

### **Physiology Practicals Skill Laboratory (SKL)**

Topic	At the end of practical students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Estimation of hemoglobin Practical I	<ul> <li>Apparatus identification</li> <li>Detail procedure</li> <li>Precautions</li> <li>Aseptic measures taken during blood sampling</li> </ul>	P, A	Skill lab	OSPE
Estimation of hematocrit Practical I	<ul><li> Hct definition</li><li> How to measure</li><li> Precautions</li></ul>	P,A	Skill lab	OSPE
ESR Practical I	<ul> <li>Procedure</li> <li>Precautions</li> <li>Clinical importance of ESR, normal values</li> </ul>	P,A	Skill lab	OSPE
Preparation of DLC	<ul> <li>Preparation of slide – practice</li> <li>How to make blood film</li> <li>How to stain it after preparation</li> <li>Help of teaching aid identification of cells</li> </ul>	P,A	Skill lab	OSPE

### **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	At the End of Practical Students Should Be	Learning	Teaching	Assessment
	Able To	Domain	Strategy	Tool
Color test for detection of	Biuret test	P		
amino acids	Ninhydrin Test		Skill Lab	OSPE
Color test for detection of	Xanthoprotic Test	P		
amino acids	Million- Nasse's Test		Skill Lab	OSPE
Color test for detection of	Arginine by Sakaguchi's Test	P		
amino acids	Tryptophan by Aldehyde Test		Skill Lab	OSPE
Quantitative Analysis	Serum calcium	P	Skill Lab	OSPE
	Serum Ascorbic Acid			

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Case Based Learning (CBL)**

Subject	Topic	Learning Objectives	Learning
		At the end of the lecture the student should be able to	Domain
	Shoulder Dislocation	Apply basic knowledge of subject to study clinical	C1
Anatomy		case.	
	Wrist Drop	Apply basic knowledge of subject to study clinical	C3
	_	case.	
	Paresthesia	Apply basic knowledge of subject to study clinical	C3
Physiology		case.	
	Insecticide poisoning	Apply basic knowledge of subject to study clinical	C3
		case.	
	Night Blindness	Apply basic knowledge of subject to study clinical	C3
Biochemistry		case.	
	Rickets	Apply basic knowledge of subject to study clinical	C3
		case.	

## **Large Group Interactive Sessions (LGIS)**

#### **Community Medicine**

Topic	Learning Objectives	Learning	_	
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
	At the end of session students will be able to			
Accidents	<ol> <li>Categorize different types of accidents</li> </ol>	C2	LGIS	MCQs
	2. Describe risk factors involved in accidents	C2		
	<ol> <li>Participate in activities/programs for prevention and control of accidents</li> </ol>	C2		
	4. Describe steps involved in prevention of different types of accidents.	C2		

#### Medicine

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Osteoporosis	Enlist causes Osteoporosis	C2		
	Discuss changes in bones in Osteoporosis	C2		
	Describe clinical features	C2	LGIS	MCQs
	Enlist investigation			
	Discuss management	C2		
	• Differentiate different causes of polyarthritis	C2		
	• on basis of clinical features			MCQs
Polyarthritis	• Discuss the diagnostic criteria of rheumatoid arthritis	C2	LGIS	
	• Discuss the diagnostic criteria of SLE	C2		
	• Plan investigations of a patient with polyarthritis to find out etiology	C3		
	• Discuss general and specific management of a patient with polyarthritis	C2		
	• Enlist causes of rickets	C1		
	• Discuss changes in bones in osteomalacia	C2		
Osteomalacia /rickets	Describe clinical features of osteomalacia & rickets	C2	LGIS	MCQs
	• Enlist investigations for of osteomalacia & rickets	C1		
	Discuss management of osteomalacia & rickets	C2		

### Surgery

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teachin g Strategy	Assessment Tool
	Discuss the possible sites of shoulder dislocation	C2		
Shoulder	Discuss the consequences of dislocation	C2	LGIS	MCQs
dislocation	Management concepts	C2		
Tennis elbow,	<ul><li>Describe:</li><li>Tennis elbow</li></ul>	C2	LGIS	MCQs
fracture of	Discuss fractures of radius and ulna	C2		

olecranon, radius	Describe the common sites of fracture	C2	
and ulna	Management concepts	C2	

#### **List of MSK-I Module Vertical Courses Lectures**

<b>Sr.</b> #	Date/Day	Department	Time	Topic of Lectures	Teacher's Name & Contact #
1.	Friday 29-03-24	Surgery	10:00 AM – 11:00 AM	Shoulder Dislocation	Dr. Rana Muhammad Adnan 0334-5410748
					Dr. Junaid khan 0300-8359907
2.	Tuesday	Medicine	08:00 AM – 09:00 AM	Osteoporosis	Dr. Saima Meer 0343-5761430
	02-04-24				Dr. Javeria Malik 0345-5405248
3.	Monday	Medicine	08:00 AM - 09:00 AM	Osteomalacia, Rickets & Polyarthritis	Dr. Umer Draz 0314-5316163
	29-04-24				Dr. Iqra 0342-5430577
4.	Tuesday 30-04-24	Community Medicine	11:20 AM – 12:20 PM	Accidents	
5.	Thursday 02-05-24	Community Medicine	11:20 AM – 12:20 PM	Accidents	
6.	Saturday	Surgery	11:20 AM – 12:20 PM	Tennis elbow, Fracture of olecranon, Radius	Dr. Rana Muhammad Adnan
	11-05-24			and Ulna	0334-5410748
					Dr. Junaid khan 0300-8359907

#### **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

#### **Content**

- Longitudinal Themes
  - o The Holy Quran Translation
  - o Seerat Mubarak
  - o Biomedical Ethics & Professionalism
  - o Family Medicine
  - o Artificial Intelligence (Innovation)
  - o Integrated Undergraduate Research Curriculum (IUGRC)
  - o Early Clinical Exposure (ECE)

### **The Holy Quran Translation Lecture**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Imaniat	<ul> <li>Describe the Concept of Tauheed</li> <li>Explain the attributes of pious</li> <li>Discuss the attributes of Allah Almighty</li> <li>Explain Hazarat Uzair's and Hazarat Ibrahim's experience about resurrection</li> </ul>	C2	LGIS	SAQ

#### **Seerat Mubarak**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
	<ul> <li>Discuss the meaning of Seerat un Nabi</li> <li>Explain the importance of knowing the Seerah of</li> </ul>	C2	LGIS	SAQ
Seerah Studies	Prophet			

### **Family Medicine**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
	<ul> <li>Describe presenting complains of patients with body aches</li> </ul>			
Approach to a Patient with body aches	Discus complications of body aches	C3	LGIS	MCQs
	Describe initial treatment of patients with body aches			
acrics	Know when to refer patient to consultant/ Hospital			

## **Integrated Undergraduate Research Curriculum (IUGRC)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
	Practical based teachings			
	<ul> <li>Comprehend their role in under "theme and scheme" of IUGRC-1st Year Practical component</li> </ul>			
Duratical Cassian I	• Understand the techniques used to access, retrieve, and review and source of Scientific literature on the given topics (on selected topics for "updated evidence in Health" (UEIH) for poster development.			
Practical Session -I (Club Activity)	<ul> <li>Make search string and perform literature search using Boolean operators</li> </ul>			3.5000
(Club Activity)	<ul> <li>Access scientific databases and carry out an effective literature review using a number of sources or databases (PubMed)</li> </ul>		LGIS	MCQS
	<ul> <li>Access HEC Digital library / PERN network use</li> </ul>			
	Understand EBM Cycle & its 5 steps			
	<ul> <li>How to configure &amp; present a scientific poster / element of a scientific poster</li> </ul>			
	How to write References of the information cited			
	Learn overall posters' work reporting guidelines			

#### **Biomedical Ethics & Professionalism**

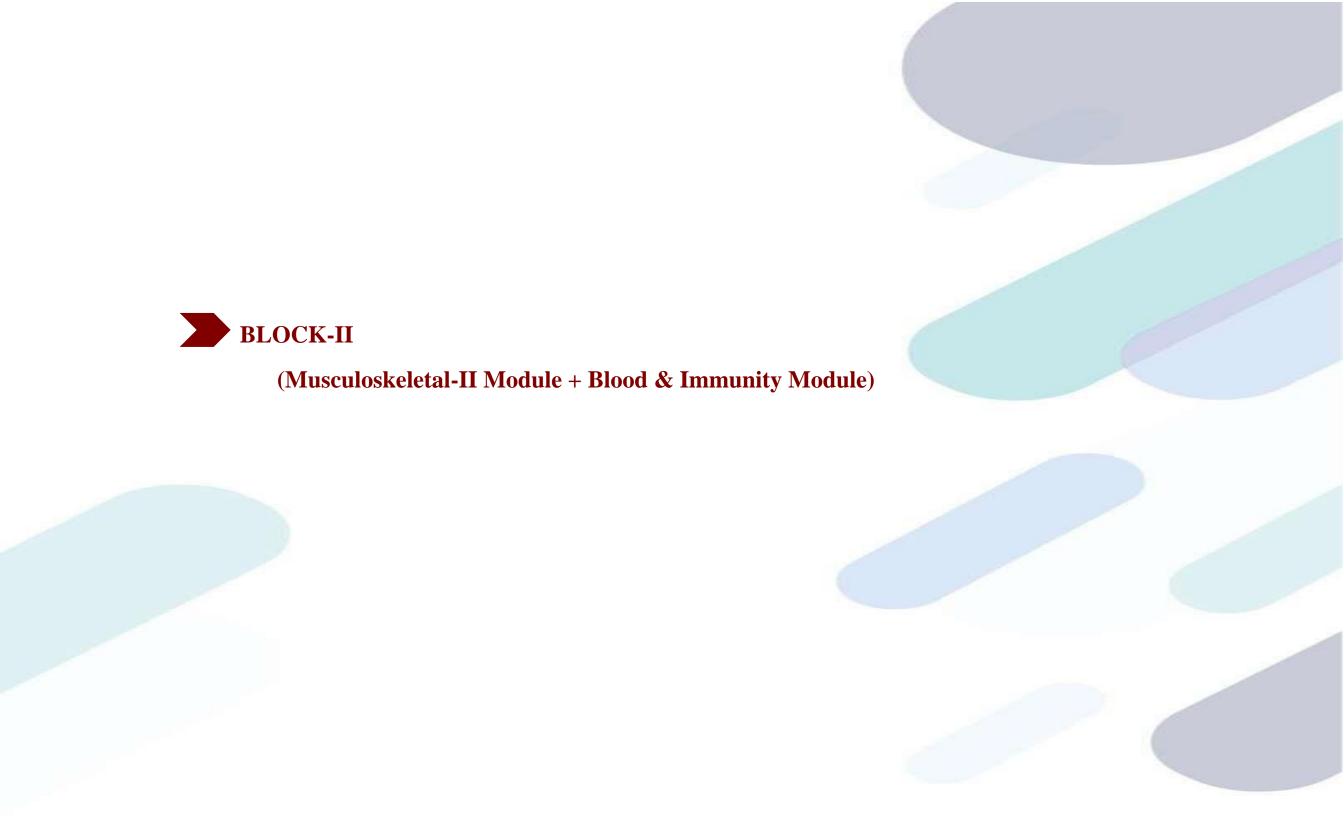
Topic	Learning Objectives	Learning	<b>Teaching</b>	Assessment
	At the end of the lecture the student should be able to		Strategy	Tool
Islamic	Conceptualize the Islamic teachings of medical ethics	C2		
concepts of	Outline the main points in oath of Muslim doctor	C2	LGIS	MCQs
Bioethics	• Correlate the 4 principles of medical ethics with principles of Islamic medical ethics			

### Radiology/Artificial Intelligence (Innovation)

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Fractures of upper limb	<ul> <li>Discuss fractures of upper limb with their clinical significance.</li> <li>Discuss role of artificial intelligence in interpretation of radiographs</li> </ul>	C2	LGIS	MCQS

### **List of MSK-I Module Spiral Courses Lectures**

Sr. #	Date/Day	Department	Time	Topic of Lectures	Teacher's Name & Contact #
1.	Monday	Bio Ethics	11:00 AM – 11:50 AM	Islamic concept of Bioethics	`Dr. Kashif Rauf 0300-6097484
	01-04-24				Dr. Fahd Anwar 0300-5156800
2.	Wednesday	Family Medicine	11:00 AM – 11:50 AM	Approach to a patient with Body Pains	Dr. Sadia 0336-5091229
	03-04-24				Dr. Sidra Hamid 0331-5025147
3.	Friday	Quran Translation	09:00 AM – 10:00 AM	Imaniat	Moulana Abdul Wahid
	26-04-24				Mufti Naeem Sherazi
4.	Friday	Seerat Mubarak	10:00 AM – 11:00 AM	The Significance of Seerah Studies	Mufti Naeem Sherazi
	26-04-24				Moulana Abdul Wahid
5.	Saturday	Artificial Intelligence	10:00 AM – 11:00 AM	Interpretation of upper limb Radiograph & use of AI	
	04-05-24	Radiology			





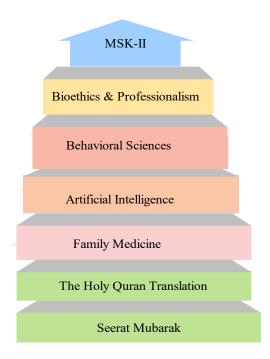
# Musculoskeletal -II Module



#### **Integration of Disciplines in Musculoskeletal-II Module**



#### **Spiral / General Education Cluster Courses**



## **Discipline Wise Details of Modular Content**

Block	Module	<b>General Anatomy</b>	Embryology	Histology	Gross Anatomy			
	<ul> <li>Anatomy</li> </ul>	<ul><li>Muscles</li><li>Skin</li></ul>	<ul> <li>Development of Axial Skeleton</li> <li>Development of limbs</li> <li>Development of muscles</li> </ul>	General Histology  Muscles Skin Skin appendages	Gluteal Region to Lateral compartment of leg			
	Biochemistry	Protein chemistry, Protein separation techniques, Collagen and Elastin						
II	• Physiology	<ul> <li>Sarcotubular system, excitation contraction coupling mechanism inskeletal muscle.</li> <li>Molecular Mechanism of skeletal muscle contraction, Rigormortis, Muscular dystrophies</li> <li>Introduction to muscle physiology, Structure of sarcomere</li> <li>Energetics, efficiency and types of contraction, heat production in muscle</li> <li>Physiologic anatomy, types and properties of Smooth Muscle</li> <li>Mechanism of smooth muscle contraction &amp; its control</li> <li>Introduction to pericardium Properties of myocardium &amp; endocardium, myocardial action potential</li> <li>Regulation of myocardial activity</li> <li>Comparison of 3 types of Muscle</li> <li>Introduction to CVS</li> <li>Excitatory &amp; Conducting system of heart</li> </ul>						
	Spiral Courses							
	Bioethics & Professionalism	<ul> <li>Introduction to Professional Ethics and PM&amp;DC Code of Conduct</li> <li>History of Medical Ethics</li> </ul>						
	Behavioural Sciences	Communication Skills						
		Rights and Responsibilities of patients and doctors						
	Artificial Intelligence	Introduction to Atificial Intelligence						
	<ul> <li>Family Medicine</li> </ul>	Communication and consultation skills in Family Medicine Practice						
	The Holy Quran Translation	<ul> <li>Imaniat-I</li> <li>Ibadat-II</li> <li>Ibadat-III</li> <li>Immaniat-II</li> <li>Immaniat-III</li> <li>Ibadat-IV</li> </ul>						

Seerat Mubarak	Importance of Hadees and Sunnah					
Vertical Integration  Fractures of Lower Limb (Orthopedics) x-rays of hipbone lower limb (Radiology)						
Clinical Rotations	<ul> <li>Cases of myopathies/ muscular dystrophy</li> <li>Polymyositis/Muscle atrophy</li> <li>Muscle enzyme interpretation</li> </ul> Medicine					
	<ul> <li>Burns and Plastic Surgery</li> <li>Management of superficial and deep burns</li> </ul> Surgery					
	<ul> <li>X-Ray of Hip Bone and Hip Joint</li> <li>X ray of pelvis</li> <li>X ray of long Bones</li> </ul> Radiology					
Clinical Themes						
<ul><li>Fractures of Lower Limb</li><li>Muscular Dystrophies</li></ul>						

#### **MSK-II Module Team**

Module Name : MSK- II Module

Duration of module : 05 Weeks

Focal Person Quran Translation

Focal Person Family Medicine

Lectures

Coordinator : Dr. Fahd Anwar
Co- Coordinator : Dr. Sajjad Hussain
Reviewed by : Module Committee

Dr. Fahad Anwar

Dr. Sadia Khan

Module Committee			Module Task Force Team			
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Fahd Anwar (Demostrator of Physiology)	
2.	Chairperson Anatomy & Dean	Prof. Dr. Ayesha Yousaf	2.	DME Focal Person	Dr. Farzana Fatima	
	Basic Sciences					
3.	Director DME	Prof. Dr. Ifra Saeed	3.	Co-coordinator	Dr. Sajjad Hussain (Senior Demonstrator of Anatomy)	
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Almas (Senior Demonstrator Biochemistry	
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Fareed Ullah Khan (Senior Demonstrator Physiology) &	
					Clinical Co- Coordinatior	
6.	Focal Person Anatomy First Year	Asso. Prof. Dr. Mohtashim Hina				
	MBBS					
7.	Focal Person Physiology	Dr. Sidra Hamid	DME Implementation Team			
			1.	Director DME	Prof. Dr. Ifra Saeed	
8.	Focal Person Biochemistry	Dr. Aneela Jamil	2.	Assistant Director DME	Dr. Farzana Fatima	
9.	Focal Person Pharmacology	Dr. Zunera Hakim	3.	Implementation Incharge 1st & 2 <sup>nd</sup>	Prof. Dr. Ifra Saeed	
				Year MBBS	Dr. Farzana Fatima	
10.	Focal Person Pathology	Dr. Asiya Niazi	4.	Editor	Muhammad Arslan Aslam	
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir				
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom				
1		I				

#### Module III – MSK-II Module

**Rationale**: This module describes the structural organization, functions, and congenital anomalies of musculoskeletal system. It explains the mechanism of neuromuscular transmission, comparison of three types of muscle and physiology of smooth and cardiac muscle, its biochemical basis and the importance of Ca++ in the body. This module covers cardiac muscle physiology including conducting system of heart. It depicts structure and function of joints in upper and lower limb. It elaborates identification of common fractures of long bones on radiograph.

#### **Module Outcomes**

At the end of this module the student should be able to:

#### **Knowledge:**

- 1. Explain the development & structure of musculoskeletal system.
- 2. Explain the physiological and biochemical factors affecting neuromuscular transmission.
- 3. Explain physiology of smooth and cardiac muscle.
- 4. Apply the knowledge of the basic sciences to understand common fractures.
- 5. Use technology based medical education including.
  - Artifical Intelligence.
- 6. Appreciate concepts & importance of
  - Family Medicine
  - Biomedical Ethics
  - Research

#### **Skill:**

- 1. Dissect limbs to demonstrate regional Anatomy and relationships of various structures to each other.
- 2. Identify histological features of connective tissue and muscles under microscope.
- 3. Perform practicals on estimation of calcium and protein chemistry.

#### **Attitude:**

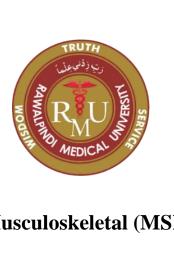
1. Demonstrate a professional attitude, team building spirit and good communication skills and cadaveric handling

#### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



Syllabus of Musculoskeletal (MSK-II) Module

# Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry) Anatomy Large Group Interactive Session (LGIS)

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Lecture Students Should Be Able To:	Domain	Strategy	Tools
	Classify muscles with examples according to	C1		
	i) Shape`			
	ii) Histology			
	iii) Development			1.500
	iv) Contraction	G2	T 0.T0	MCQ
General Anatomy	Describe the general features of skeletal muscle.	C3	LGIS	SAQ
(Muscle I)	• Differentiate between Red white and intermediate fibers.	C3		VIVA
	• Describe blood supply and nerve supply of skeletal muscles.	C3		
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3 C3		
	Practice the principles of Bioethics			
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Classify muscle on histological basis.	C1		
	Describe histological structure of skeletal muscles	C2		
Histology	Discuss ultrastructure of skeletal muscles	C2		MCQ
(Skeletal Muscle)	Understand the contraction mechanisim	C2	LGIS	SAQ
	Correlate the clinical conditions	C3		VIVA
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Discuss connective tissue associated with skeletal muscle.	C2		
	Discuss parts of skeletal muscles.	C2		
General Anatomy	Give classification of skeletal muscles.	C1		
(Muscle II)	Explain the actions of a prime mover or agonist Fixators	C2		
	Synergist and antagonist with examples.	C3	LGIS	MCQ
	<ul> <li>Correlate the clinical conditions</li> </ul>	C3		SAQ

	<del>-</del>			
	Understand the preventive and curative health care measures	C3		VIVA
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Describe histological structure of cardiac and smooth muscles	C2		
	Describe ultrastructure of smooth and cardiac muscles.	C2		
	Differentiate between skeletal smooth and cardiac muscles.	C2		
Histology	Discuss regeneration of muscle fibers	C2		MCQ
(Cardiac &	Correlate the clinical conditions	C3	LGIS	SAQ
Smooth Muscles)	<ul> <li>Understand the preventive and curative health care measures</li> </ul>	C3		VIVA
	<ul> <li>Practice the principles of Bioethics</li> </ul>	C3		
	<ul> <li>Apply strategic use of AI in health care</li> </ul>	C3		
	Read relevant research article	C3		
	Read relevant research article	C3		
	Enlist common ante of intercommentary eventure	C1		
	Enlist components of integumentary system	C2		
	• Describe histological structure of skin with special reference to cells residing in epidermis.			MCQ
Histology	5 1		LGIS	SAQ
(Skin)	Describe histological features of thick and thin skin      Differentiate between thick and thin skin	C2		VIVA
	Differentiate between thick and thin skin	C2		
	Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
		C3		
F 1 1	Discuss the cartilagenous stage of vertebral column	C2		1400
Embryology	Discuss the bony stage of vertebral column	C2	1 010	MCQ
(Development Of	• Describe development of ribs and sternum.	C2	LGIS	SAQ
Axial Skeleton)	Correlate the clinical conditions	C3		VIVA
	• Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3 C3		
		L C3		

	·			
	Describe appendages of skin	C2		
	Discuss histological structure of hair	C2		
	Discuss histological structure of nail	C2		MCQ
Histology	Discuss histological structure of glands of skin	C2	LGIS	SAQ
(Skin Appendages)	Correlate the clinical conditions	C3		VIVA
	Understand the preventive and curative health care measures	C3		
	<ul> <li>Practice the principles of Bioethics</li> </ul>	C3		
	<ul> <li>Apply strategic use of AI in health care</li> </ul>	C3		
	Read relevant research article	C3		
	Read relevant research article	C3		
	Enlist different stages of limb development	C1		
Embryology	Discuss early and late stage of limb development	C2		MCQ
(Development of	Correlate congenital anomalies of limb development	C3	LGIS	SAQ
limbs)	Correlate the clinical conditions	C3		VIVA
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Discuss development of skeletal muscle with special	C2		
	reference to myotomes, pharyngeal arch muscles and limb	C2		
Embryology	muscle along with limb skeleton.			MCQ
(Development Of	Describe development of smooth and cardiac muscles with	C3	LGIS	SAQ
Muscles)	anomalies.			VIVA
,	Correlate the clinical conditions	C3		
	<ul> <li>Understand the preventive and curative health care measures</li> </ul>	C3		
	<ul> <li>Practice the principles of Bioethics</li> </ul>	C3		
	<ul> <li>Apply strategic use of AI in health care</li> </ul>	C3		
	Read relevant research article	C3		
	• Read relevant research article	C3		
	Enlist functions of skin	C1		
	Discuss types of skin	C2		
	Compare between thick and thin skin	C2		MCQ
	Classify skin lines	C1	LGIS	SAQ
General Anatomy	<ul> <li>Describe the significance of skin lines</li> </ul>	C2		VIVA
(Skin)	Discuss burns of skin	C3		
	2 Discuss ouring of skill	C3		

Correlate the clinical conditions	C3	
• Understand the preventive and curative health care measures	C3	
<ul> <li>Practice the principles of Bioethics</li> </ul>	C3	
<ul> <li>Apply strategic use of AI in health care</li> </ul>	C3	
Read relevant research article		

# **Physiology Large Group Interactive Session (LGIS)**

Topic	Learning Objectives At The End Of Lecture Students Should Be Able To:	Learning Domain	Assessment Tool	References	Learning Resources
Introduction to muscle physiology, Structure of Sarcomere	Explain the physiologicanatomy of skeletal muscle Draw and label thesarcomere	C2	MCQ SAQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 01,Excitable tissue:Muscle (Chapter 05, Page 99)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cellular Physiology (Chapter 1. Page 34)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Muscle (Chapter 12,Page 411)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Contraction of Skeletal muscle. Section 02. (Chapter 06, Page 79)</li> </ul>	<ol> <li>https://youtu.be/8iklTDlra 5Q</li> <li>https://www.sciencedirect .com/science/article/abs/p ii/0197018687901070</li> <li>https://teachmephysiology .com/histology/tissue-structure/muscle-histology/skeletal-muscle/</li> </ol>

	Discuss the sliding filament model of muscle contraction.  Describe the structure sarcotubular system andits importance in musclecontraction	C2 C2	MCQ SAQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 01, Excitable tissue:Muscle (Chapter 05, Page 103)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cellular Physiology (Chapter 1. Page 36)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 413,421)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 68)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter</li> </ul>	<ol> <li>https://www.sciencedirec t.com/science/article/abs/ pii/0197018687901070</li> <li>https://youtu.be/8iklTDlr a5Q .https://link.springer.com/ article/10.1007/s12551- 013-0135-x</li> </ol>
--	--	----------	--------------------	--	--

Molecular Mechanism of skeletal muscle contraction, Rigor mortis, Muscular dystrophies	Define motor unit Discuss recruitment and its effect on force of contraction Discuss Molecular Mechanism of skeletal muscle contraction	C1 C2	MCQ SAQ VIVA	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 36)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 413,421)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, , (Chapter 04,page 70)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 82,88)</li> </ul>	1. <a href="https://youtu.be/RTn">https://youtu.be/RTn</a> <a href="https://youtu.be/NvV2x">KBt2sDf0</a> 2. <a href="https://youtu.be/NvV2x">https://youtu.be/NvV2x</a> <a href="https://youtu.be/NvV2x">TrShvg</a>
Length tension curve, Load and velocity of contraction, diseases of muscle	Draw and describe Length duration curve Load and velocity of contraction	C2	MCQ SAQ VIVA	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 39)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 431,435)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, , (Chapter 04,page 74)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06,</li> </ul>	<ol> <li>https://www.urmc.roc hester.edu/encycloped ia/content.aspx?Conte ntTypeID=85&amp;Conte ntID=P00792</li> <li>https://www.sciencedi rect.com/topics/engin eering/length-tension- curve</li> </ol>

				Page 91)	
Energetics, efficiency and types of contraction, heat production in muscle	Elaborate Energetic and efficiency of contraction. Discuss heat production in nerve and muscle	C3	MCQ SAQ VIV A	<ul> <li>Human Physiology by Dee         Unglaub Silver thorn. 8TH         Edition.Muscle (Chapter 12,Page         431)</li> <li>Physiological Basis of Medical         Practice by Best &amp; Taylor's.13th         Edition.Section 01, Excitation and         Contraction of Skeletal muscle, ,         (Chapter 04,page 77,84)</li> <li>Textbook of Medical Physiology         by Guyton &amp; Hall.14th         Edition.Contraction of Skeletal         muscle.Section 02. (Chapter         06, Page 85,87)</li> </ul>	1. <a href="https://www.sciencedi-rect.com/topics/engin-eering/length-tension-curve">https://emgth-tension-curve</a> 2. <a href="https://youtu.be/3ntulKD4kvY">https://youtu.be/3ntulKD4kvY</a>
Properties of skeletal muscles, Tetanus & Fatigue	Discuss various properties of skeletal muscle in detail Tetanus and fatigue	C2	MCQ SAQ VIVA	<ul> <li>Ganong's Review of Medical         Physiology.25TH Edition.Section             01,Excitable tissue:Muscle (Chapter             05, Page 110)     </li> <li>Human Physiology by Dee             Unglaub Silver thorn. 8TH             Edition.Muscle (Chapter 12,Page             422,424,428)</li> <li>Physiological Basis of Medical             Practice by Best &amp; Taylor's.13th             Edition.Section 01, Excitation and             Contraction of Skeletal muscle,             (Chapter 04,page</li></ul>	1. https://youtu.be/v5N m_LaAQVo  2. https://www.sciencedirect.com/science/article/abs/pii/S238702062 2003485

Introduction to CVS	Introduction to Cardiovascular system. Classify blood vessels	C1	MCQ SAQ VIVA	<ul> <li>Ganong's Review of Medical         Physiology.25TH Edition.Section         05,Cardioascular physiology         (Chapter 29, Page 519)</li> <li>Human Physiology by Dee Unglaub         Silver thorn. 8TH Edition.         Cardioascular physiology         (Chapter 14,Page 469)</li> <li>Physiological Basis of Medical         Practice by Best &amp; Taylor's.13th         Edition.Section 02, Introduction to         Cardiovascular system.(Chapter         05,page 101)</li> <li>https://joutu.be/28C         YhgjrBLA</li> <li>https://litfl.com/cardiovascular-physiology         overview/</li> </ul>
Physiologic anatomy, types and properties of Smooth Muscle	Enlist type of smooth muscles and explain their characteristics Explain the properties of smooth muscle	C1 C2	MCQ SAQ VIVA	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 40)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 436)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Excitation and Contraction of Smooth muscle.Section 02. (Chapter 08, Page 101)</li> <li>https://www.kenhub.c om/en/library/anatom y/smooth-musculature</li> <li>https://youtu.be/qEV RoKuoj4U</li> </ul>
Introduction to pericardium Properties of myocardium & endocardium, myocardial	Describe the physiologic anatomy of myocardium Discuss properties of myocardium Discuss in detail various properties of myocardium Describe the mechanism of production of action potential and its propagation	C1 C2	MCQ SAQ VIV A	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 14. Page 131)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page</li> <li>https://youtu.be/L2Gf 9cj7jBw</li> <li>https://www.sciencedi rect.com/topics/medic ine-and- dentistry/cardiac- action-potential</li> </ul>

action potential	Describe excitation contraction coupling in detail Discuss propagation of electrical activity in cardiac muscle	C1 C2		<ul> <li>482)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. (Chapter 09, Page 114)</li> </ul>	
Mechanism of smooth muscle contraction & its control	Explain the chemical and physical basis of smooth muscle contraction	C2	MCQ SAQ VIVA	<ul> <li>Ganong's Review of Medica         Physiology by Linda S. Costanzo 6th         Edition.Cellular Physiology (Chapter         1. Page 42)     </li> <li>Human Physiology by Dee         Unglaub Silver thorn. 8TH         Edition.Muscle (Chapter 12,Page         439,443)     </li> <li>Textbook of Medical Physiology by         Guyton &amp; Hall.14th Edition.         Excitation and Contraction of Smooth             muscle.Section 02. (Chapter 08, Page         103,105)     </li> </ul>	1. <a href="https://www.kenhub.c">https://www.kenhub.c</a> om/en/library/anatom y/smooth-musculature  2. <a href="https://youtu.be/qEV">https://youtu.be/qEV</a> RoKuoj4U
Regulation of myocardial activity	Describe the regulation of pumping activity of heart	C1	MCQ SAQ VIVA	Textbook of Medical Physiology by Guyton & Hall.14th Edition. Excitation and Contraction of Smooth muscle.Section 02. (Chapter 09, Page 123)	<ol> <li>https://pubmed.ncbi.nl m.nih.gov/1661829/</li> <li>https://www.sciencedi rect.com/topics/medic ine-and- dentistry/cardiac- action-potential</li> </ol>
Comparison of 3 types of muscle	Discuss differences among three types of muscle in detail	C2	MCQ SAQ VIV A	Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 444)	1. <a href="https://training.seer.c">https://training.seer.c</a> <a href="mailto:ancer.gov/anatomy/m">ancer.gov/anatomy/m</a> <a href="mailto:uscular/types.html">uscular/types.html</a> 2. <a href="https://youtu.be/eShB">https://youtu.be/eShB</a> <a href="mailto:Z3-RxHA">Z3-RxHA</a>

Excitatory & Conducting system of heart	<ul> <li>Describe the conductive system of heart in detail</li> <li>Enlist the various components of conductive system of heart</li> <li>Describe the mechanism of production of action potential in SA node, AV node, ventricles.also describe its propogation</li> </ul>	C1 C1 C1	MCQ SAQ VIV A	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 488)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 08,page 155,162)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Section 02. (Chapter 10, Page 127,133)</li> </ul>	3. <a href="https://youtu.be/TnFoJ7Hhi-M">https://youtu.be/TnFoJ7Hhi-M</a> 4. <a href="https://teachmeanatomy.info/thorax/organs/heart/conducting-system/">https://teachmeanatomy.info/thorax/organs/heart/conducting-system/</a>
---	--	----------------	------------------------	---	---

## **Biochemistry Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of lecture students should be able to	Domain	strategy	Tool
	Protein chemistry			
	Describe amphoteric properties of amino acids	C2		
Properties of amino	Discuss Post transitional amino acids and location		LGIS	MCQs,
acids& Important	of amino acids in proteins	C2		SAQs &
peptides	Explain Important peptides	C2		Viva
	Discuss Importance of proteins	C1		
Proteins	Classify proteins	C2	LGIS	MCQs,
	Describe Functions of proteins	C2		SAQs &
	Describe I unctions of proteins			Viva
	Describe Primary structure of protein	C2		MCQs,
Primary structure of	Discuss Peptide bond	C2	LGIS	SAQs &
proteins	r			Viva

Secondary structure of proteins	<ul> <li>Enlist Types of secondary structure.</li> <li>Describe Secondary structure of proteins.</li> <li>Elaborate Significance of secondary structure</li> </ul>	C1 C2 C2	LGIS	MCQs, SAQs & Viva
Tertiary and quaternary structure	<ul> <li>Describe Tertiary and quaternary structure of proteins</li> <li>Understand the forces stabilizing protein structure</li> </ul>	C2 C2	LGIS	MCQs, SAQs & Viva
Protein folding And denaturation	<ul> <li>Discuss Folding of proteins</li> <li>Describe protein misfolding</li> <li>Interpret the clinical cases related to protein misfolding</li> <li>Discuss denaturation of proteins</li> </ul>	C2 C2 C3 C2	LGIS	MCQs, SAQs & Viva
Collagen and Elastin	<ul> <li>Describe structure of collagen and elastin</li> <li>Discuss differences between collagen and elastin</li> <li>Explain Synthesis of collagen</li> <li>Enlist Factor regulating and helping in strengthening of collagen</li> <li>Interpret defects of collagen synthesis and elastin</li> </ul>	C2 C2 C2 C1 C3	LGIS	MCQs, SAQs & Viva
Techniques for separation of proteins	Describe Techniques for separation of proteins	C2	LGIS	MCQs, SAQs & Viva

## **Anatomy Small Group Discussion (SGDs)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	Students Should Be Able To	Domain	Strategy	Tools
	Demonstrate the anatomical position	P		
	Identify bony features of ilium.	C1		
	Describe the muscular, ligamentous, and capsular			MCQ
Hip Bone-I	attachments.	C2		SEQ
	• Discuss the ventral and dorsal auricular surfaces,		Skill Lab	VIVA
	ossification.	C2		OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health	G 2		
	care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	5	C3		
	Demonstrate the anatomical position	P		
	• Identify bony features of pubis and ischium.	C1		
	Describe the muscular, ligamentous, and capsular	C2		
Uin Dona II	attachments.	C2		MCQ
Hip Bone-II	Discuss the ventral and dorsal auricular surfaces,	C2	Skill Lab	SEQ
	ossification.	C2 C3	SKIII Lau	SEQ VIVA
	Correlate the clinical conditions	CS		OSPE
	Understand the preventive and curative health	C3		OSIL
	care measures	C3		
	<ul> <li>Practice the principles of Bioethics</li> </ul>	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Demonstrate the anatomical position of bone	P		
	<ul> <li>Demonstrate the anatomical position of bone</li> <li>Demonstrate different parts</li> </ul>	C1		
Femur	<ul> <li>Demonstrate different parts</li> <li>Describe proximal and distal articulations</li> </ul>	C2		MCQ
	<ul> <li>Describe proximal and distal articulations</li> <li>State angle of femoral torsion.</li> </ul>	C1		SEQ
			Skill Lab	VIVA
		C3		OSPE
	Understand the preventive and curative health			

Femur and Patella	<ul> <li>care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply strategic use of AI in health care</li> <li>Read relevant research article</li> <li>Demonstrate the anatomical position of bones</li> <li>Describe muscle attachment and ossification</li> <li>Discuss fractures with special reference to the fracture of neck of femur in old age.</li> <li>Describe anatomy of patella and factors responsible for its stability.</li> <li>Enumerate different bursae related to patella</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply strategic use of AI in health care</li> <li>Read relevant research article</li> </ul>	C3 C3 C3 C3 C3 P C2 C2 C1 C3 C3 C3 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Anterolateral Compartment of Thigh (Muscles)	<ul> <li>Describe the origin and insertion of muscles in anterior compartment of thigh.</li> <li>Describe the origin and insertion of muscles in lateral compartment of thigh.</li> <li>Discuss the femoral triangle and adductor canal with contents</li> <li>Identify these muscles.</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply strategic use of AI in health care</li> <li>Read relevant research article</li> </ul>	C2 C2 C1 C3 C3 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
	Describe the nerves and vessels of anterolateral compartment of thigh	C2		

Anterolateral	Discuss various relation of vessels and nerves in			MCQ
compartment of	anterolateral compartment of thigh	C2	Skill Lab	SEQ
thigh	Identify these structures	C1		VIVA
(Neurovascular	Map the outline of femoral artery in a simulated			OSPE
organization)	patient / model	P		
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health			
	care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Describe the muscles of medial compartment of	C2		
	thigh			MCQ
	Discuss origin, insertion and nerve supply of	C2	Skill Lab	SEQ
	medial compartment of thigh	CZ		VIVA
Medial	Describe the course relations and branches of	G2		OSPE
Compartment of	obturator nerve.	C2		
thigh	Correlate the clinical conditions			
	Understand the preventive and curative health	C3		
	care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Tabulate the he various muscles of gluteal region	C2		
	with origin, insertion, action nerve supply.	CZ		
	<ul> <li>Enlist various structures undercover of gluteal</li> </ul>	C1		MCQ
Gluteal Region	maximus i.e. muscles, vessels, nerves, bones and	<b>C1</b>		SEQ
(Muscles)	joints, ligaments, bursae.		Skill Lab	VIVA
(1.1000100)	Understand the preventive and curative health			OSPE
	care measures			
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	- Road folovalit foscaron article	C3		

Gluteal Region (Neurovascular organization)	<ul> <li>anastomosis.</li> <li>Enumerate the structures passing through greater sciatic foraman.</li> <li>Discuss the formation course relations, branches, distribution of sciatic nerve with applied anatomy</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply strategic use of AI in health care</li> <li>Read relevant research article</li> </ul>	C1 C2 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Posterior Compartment of Thigh (Muscles)	<ul> <li>Enlist the Hamstring muscles</li> <li>Discuss origin insertion, nerve supply and actions</li> <li>Identify the muscles</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply strategic use of AI in health care</li> <li>Read relevant research article</li> </ul>	C1 C2 C1 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Posterior Compartment of thigh (Neurovascular Organization)	<ul> <li>Describe the nerves and vessels of posterior compartment of thigh</li> <li>Discuss course, relations, distribution and branches of neurovascular structures of posterior compartment</li> <li>Identify these structures</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply strategic use of AI in health care</li> <li>Read relevant research article</li> </ul>	C2 C2 C1 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE

		C3		
		C3		
	Describe the type of joint	C2		
	Describe articular surfaces,	C2		
	<ul> <li>Describe capsular attachments.</li> </ul>	C2		
	<ul> <li>Discuss synovial membrane and its folding.</li> </ul>	C2		MCQ
	<ul> <li>Enlist ligaments and their attachments</li> </ul>	C1		SEQ
Hip Joint	<ul> <li>Discuss movements possible at hip joint and muscles producing them</li> </ul>	C2	Skill Lab	VIVA OSPE
	<ul> <li>Describe blood supply and nerve supply.</li> </ul>	CO		
	Correlate the clinical conditions	C2 C3		
	Understand the preventive and curative health	C3		
	care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Identify bone	C1		
	Demonstrate its side.	P		
Tibia	Demonstrate its normal anatomical position.	P		
	Describe bony features.	C2		MCQ
	Discuss attachment of muscle and ligament	C2		SEQ
	Describe articular surfaces	C2	Skill Lab	VIVA
	<ul> <li>Identify nutrient foramen</li> </ul>	C1		OSPE
	Describe its ossification	C2		
	Correlate the clinical conditions	C3		
	<ul> <li>Understand the preventive and curative health</li> </ul>			
	care measures	C3		
	<ul> <li>Practice the principles of Bioethics</li> </ul>	C3		
	<ul> <li>Apply strategic use of AI in health care</li> </ul>	C3		
	<ul> <li>Apply strategic use of Al in health care</li> <li>Read relevant research article</li> </ul>	C3		
		C3		
	Identify bone	C1		
	Demonstrate its side.	P P		
	Demonstrate its normal anatomical position.	C2		MCO
	Describe bony features.	C2		MCQ

Fibula	Discuss attachment of muscles and ligaments	C2	Skill Lab	SEQ
	Describe articular surfaces	C2		VIVA
	Identify nutrient foramen	C1		OSPE
	Describe its ossification	C2		
	Correlate the clinical conditions	C3		
	<ul> <li>Understand the preventive and curative health</li> </ul>	C3		
	care measures			
	<ul> <li>Practice the principles of Bioethics</li> </ul>			
		C3		
	Apply strategic use of AI in health care  Productive and productive activities.	C3		
	Read relevant research article	C3		
		C3		
	Identify surface landmarks	C1		
Popliteal Fossa	Enlist contents	<b>C</b> 1		MCQ
	<ul> <li>Discuss boundaries, roof and floor</li> </ul>	C2	Skill Lab	SEQ
	Map the outline of popliteal artery in a simulated			VIVA
	patient / model	P		OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health			
	care measures			
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Troud Tota ( unit Tosaul of unitary	C3		
	State type of joint	C1		
	Describe its articular surfaces	C2		
	<ul> <li>Demonstrate capsular attachments,</li> </ul>	P		
	<ul> <li>Enlist extra capsular and intracapsular ligaments</li> </ul>			
	and their attachments	C1		MCQ
Knee Joint	<ul> <li>Demonstrate the movements possible at knee joint</li> </ul>		Skill Lab	SEQ
	and muscles producing them.	P		VIVA
	<ul> <li>Describe the concept of locking and unlocking of</li> </ul>			OSPE
	knee joint	C2		
	<ul> <li>Describe blood supply and nerve supply of joint</li> </ul>	C2		
	<ul> <li>Describe blood supply and herve supply of joint</li> <li>Correlate the clinical conditions</li> </ul>			
	• Contract the chinear conditions			

	<ul> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply strategic use of AI in health care</li> <li>Read relevant research article</li> </ul>	C3 C3 C3 C3		
Anterior Compartment of Leg (Muscles and Neurovascular Organization)	<ul> <li>Demonstrate surface landmarks</li> <li>Discuss superficial fascia &amp; deep fascia, their contents including retinecula</li> <li>Describe Origin, insertion, nerve supply and action of all muscles of anterior compartment of leg</li> <li>Identify different structures in compartment</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply strategic use of AI in health care</li> <li>Read relevant research article</li> </ul>	C3 P C2 C1 C3 C3 C3 C3 C3 C3 C3 C3	Skill Lab	MCQ SEQ VIVA OSPE
Radiology / Cross Sectional Anatomy	<ul> <li>Demonstrate major landmarks of thigh and anterior compartment of leg on radiographs</li> <li>Identify the structures present at different levels of cross sections         Upper 3<sup>rd</sup> of thigh             Mid shaft of femur             Lower 3<sup>rd</sup> of thigh             Upper part of patella             Distal part of patella             Through tibial condyles</li> </ul> <li>Correlate the clinical conditions</li>	P C2	Skill Lab	MCQ SEQ VIVA OSPE

## **Physiology Small Group Discussion (SGDs)**

Topic	Learning Objectives Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tools
	Discuss the sliding filament model of muscle contraction.	C2		MCQ
Sliding filaments of skeletal muscle, sarcotubular system	Describe the structure sarcotubular system and its importance in muscle contraction	C1	SGD	SAQ VIVA
	Enlist type of smooth muscles and explain their characteristics	C1		MCQ
Physiology of smooth muscle, mechanism of smooth muscle contraction	Discuss the properties of smooth muscle	C2	SGD	SAQ VIVA
Properties of myocardium,	Describe the physiologic anatomy of myocardium Discuss properties of myocardium.	C1		MCQ
myocardial action potential, Excitatory and conduction	• Discuss in detail various properties of myocardium Describe the mechanism of production of action potential and its propagation.	C2	LGIS	SAQ VIVA
system of heart	Describe excitation contraction coupling in detail	C1		
	Discuss propagation of electrical activity in cardiac muscle	C2		
Comparison of three types	Discuss three types of muscles	C2		MCQ
of muscle	Discuss differences among three types of muscle in detail	C2	LGIS	SAQ VIVA

## **Biochemistry Small Group Discussion (SGDs)**

Topic	Learning Objectives At The End of Tutorial Students Should Be Able	Learning Domain	Teaching Strategy	Assessment Tool
	То			
	Explain primary, secondary, tertiary and	C2		MCQs &
Protein structure	quaternary structures of proteins		SGD	SAQs
	Discuss structure of collagen	C2		MCQs &
Collagen	Describe synthesis of collagen	C2	SGD	SAQs
	Interpret related clinical disorders	C3		

## **Anatomy Self Directed Learning (SDL)**

<b>Topics Of SDL</b>	Learning Objective	References
Hip Bone	<ul> <li>Demonstrate the anatomical position</li> <li>Identify bony features of ilium.</li> <li>Describe the muscular, ligamentous, and capsular attachments.</li> <li>Discuss the ventral and dorsal auricular surfaces, ossification.</li> <li>Demonstrate the anatomical position</li> <li>Identify bony features of pubis and ischium.</li> <li>Describe the muscular, ligamentous, and capsular attachments.</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510-516,526,328,329).  https://www.youtube.com/watch?v=AeuLBN5ouwo https://link.springer.com/referenceworkentry/10.1007/978-3-030-43240-9_2
Femur	<ul> <li>Use digital library</li> <li>Demonstrate the anatomical position of bone</li> <li>Demonstrate different parts</li> <li>Describe proximal and distal articulations</li> <li>State angle of femoral torsion.</li> <li>Demonstrate the anatomical position of bone</li> <li>Describe muscle attachment and ossification</li> <li>Discuss fractures with special reference to the fracture of neck of femur in old age.</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 20,435,510,516-518,527,659-660). https://www.youtube.com/watch?v=AeuLBN5ouwo  https://link.springer.com/chapter/10.1007/978-981-13-8468-4_10
Anterolateral Compartment Of Thigh	<ul> <li>Describe the origin and insertion of muscles in anteriorlateral compartment of thigh.</li> <li>Describe the nerves and vessels of anterolateral compartment of thigh</li> <li>Discuss the femoral triangle and adductor canal with contents</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510, 545-548,557-558). https://www.youtube.com/watch?v=AeuLBN5ouwohttps://link.springer.com/article/10.1186/s10195-023-00691-w

	Identify these muscles.	
	<ul> <li>Correlate the clinical aspects</li> </ul>	
	Read relevant research article	
	Use digital library	
Medial Compartment Of Thigh	<ul> <li>Describe the muscles of medial compartment of thigh</li> <li>Discuss origin, insertion and nerve supply of medial compartment of thigh</li> <li>Describe the course relations and branches of obturator nerve.</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 548-551). https://www.youtube.com/watch?v=AeuLBN5ouwohttps://link.springer.com/article/10.1186/s10195-023-00691-w
	<ul> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	
Gluteal Region	<ul> <li>Tabulate the he various muscles of gluteal region with origin, insertion, action nerve supply.</li> <li>List various structures undercover of gluteal maximus i.e. muscles, vessels, nerves, bones and joints, ligaments, bursae.</li> <li>Describe trochancteric anastomosis and cruciate anastomosis.</li> <li>Enumerate the structures passing through greater sciatic foraman.</li> <li>Discuss the formation course relations, branches,</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510, 562-563,575-583). https://www.youtube.com/watch?v=AeuLBN5ouwohttps://link.springer.com/chapter/10.1007/978-3-030-11033-8_5
	<ul> <li>distribution of sciatic nerve with applied anatomy</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> </ul>	
	Use digital library	

Posterior Compartment Of Thigh	<ul> <li>Tabulate the Hamstring muscles</li> <li>Discuss origin insertion, nerve supply and action</li> <li>Describe the nerves and vessels of posterior compartment of thigh</li> <li>Discuss course relations distribution and branches of neurovascular structures of posterior compartment</li> <li>Identify these structures</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 569-572).  https://www.youtube.com/watch?v=AeuLBN5ouwo  https://link.springer.com/article/10.1186/s10195-023-00691-w
Hip Joint	<ul> <li>Describe the type of joint</li> <li>Describe articular surfaces,</li> <li>Describe capsular attachments.</li> <li>Discuss synovial membrane and its folding.</li> <li>Enlist ligaments and their attachments</li> <li>Discuss movements possible at hip joint and muscles producing them</li> <li>Describe blood supply and nerve supply.</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 510-626,629-632,660-661). https://www.youtube.com/watch?v=AeuLBN5ouwo  https://link.springer.com/referenceworkentry/10.1007/978-3-030-43240-9_2
Tibia	<ul> <li>Identify bone</li> <li>Demonstrate its side.</li> <li>Demonstrate its normal anatomical position.</li> <li>Describe bony features.</li> <li>Discuss attachment of muscle and ligament</li> <li>Describe articular surfaces</li> <li>Identify nutrient foramen</li> <li>Describe its ossification</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 19, 510,520-521,604). https://www.youtube.com/watch?v=AeuLBN5ouwohttps://link.springer.com/chapter/10.1007/978-3-030-93685-3_14  https://link.springer.com/chapter/10.1007/978-3-319-78387-1_69
	Identify bone	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 20,510,513,521,528,687,790).

	Demonstrate its side.	https://www.youtube.com/watch?v=AeuLBN5ouwo
	<ul> <li>Demonstrate its normal anatomical position.</li> </ul>	
Fibula	<ul> <li>Describe bony features.</li> </ul>	https://link.springer.com/chapter/10.1007/978-3-030-93685-
	<ul> <li>Discuss attachment of muscleS and ligamentS</li> </ul>	3_14
	Describe articular surfaces	
	Identify nutrient foramen	https://link.springer.com/chapter/10.1007/978-3-319-
	Describe its ossification	<u>78387-1_69</u>
	Correlate the clinical aspects	
	Read relevant research article	
	Use digital library	

## **Physiology Self Directed Learning (SDL)**

<b>Topics Of SDL</b>	Learning Objective	References	Learning Resources
SDL (On Campus): Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle	Discuss the sliding filament model of muscle contraction Describe the structure sarcotubular systemand its importance in muscle contraction	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition.Section 01,Excitable tissue:Muscle         (Chapter 05,Page 103)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup>         Edition.Cellular Physiology (Chapter 1.Page 36)</li> <li>Human Physiology by Dee Unglaub Silverthorn.         8<sup>TH</sup> Edition.Muscle (Chapter 12,Page 413,421)</li> <li>Physiological Basis of Medical Practice byBest &amp; Taylor's.13<sup>th</sup> Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 68)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06,Page 81) (Chapter 07, Page 93,97)</li> </ul>	<ul> <li>https://www.sciencedirect.com/science/article/abs/pii/0197018687901070</li> <li>https://youtu.be/8iklTDlra5Q</li> <li>https://link.springer.com/article/10.1007/s12551-013-0135-x</li> </ul>

Molecular Mechanism of skeletal muscle contraction, Rigor	Define motor unit Discuss recruitment and its effect on force of contraction	<ul> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cellular Physiology (Chapter 1.Page 36)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 413,421)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 68)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 81) (Chapter 07, Page 93,97)</li> </ul>	<ul> <li>https://youtu.be/RTnKBt2sDf0</li> <li>https://youtu.be/NvV2xTrShvg</li> </ul>
Molecular Mechanism of skeletal muscle contraction, Rigor mortis, Muscular dystrophies	Define motor unit Discuss recruitment and its effect on force of contraction Discuss Molecular Mechanism of skeletal muscle contraction	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 36)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 413,421)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, , (Chapter 04,page 70)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 82,88)</li> </ul>	<ul> <li>https://youtu.be/RTnKBt2sDf0</li> <li>https://youtu.be/NvV2xTrShvg</li> </ul>
Length tension curve, Load and velocity of contraction, diseases	Draw and describe Length duration curve Load and velocity of contraction	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 39)</li> <li>Human Physiology by Dee Unglaub Silver</li> </ul>	<ul> <li>https://www.urmc.rochester.edu/encycl opedia/content.aspx?ContentTypeID=8 5&amp;ContentID=P00792</li> <li>https://www.sciencedirect.com/topics/engineering/length-tension-curve</li> </ul>

of muscle		thorn. 8TH Edition.Muscle (Chapter 12,Page 431,435)  • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 74)  • Textbook of Medical Physiology by Guyton & Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 91)	
Energetics, efficiency and types of contraction, heat production in muscle	Elaborate Energetic and efficiency of contraction. Discuss heat production in nerve and muscle	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 431)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 77,84)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Contraction of Skeletal muscle.Section 02. (Chapter 06, Page 85,87)</li> </ul>	https://www.sciencedirect.com/topics/e ngineering/length-tension-curve     https://youtu.be/3ntulKD4kvY
Properties of skeletal muscles, Tetanus & Fatigue	Discuss various properties of skeletal muscle in detail Tetanus and fatigue	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 01,Excitable tissue:Muscle (Chapter 05, Page 110)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 422,424,428)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 01, Excitation and Contraction of Skeletal muscle, (Chapter 04,page 74,86)</li> </ul>	<ul> <li>https://youtu.be/v5Nm_LaAQVo</li> <li>https://www.sciencedirect.com/science/aricle/abs/pii/S2387020622003485</li> </ul>

Introduction to CVS	Introduction to Cardiovascular system. Classify blood vessels	<ul> <li>Ganong's Review of Medical Physiology.25TH         Edition.Section 05,Cardioascular physiology         (Chapter 29, Page 519)</li> <li>Human Physiology by Dee Unglaub         Silver thorn. 8TH Edition. Cardioascular         physiology (Chapter 14,Page 469)</li> <li>Physiological Basis of Medical Practice by Best         &amp; Taylor's.13th Edition.Section 02, Introduction         to Cardiovascular system.(Chapter 05,page 101)</li> </ul>	<ul> <li>https://youtu.be/28CYhgjrBLA</li> <li>https://litfl.com/cardiovascular-physiology-overview/</li> </ul>
Physiologic anatomy, types and properties of Smooth Muscle	Enlist type of smooth muscles and explain their characteristics Explain the properties of smooth muscle	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 40)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 436)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Excitation and Contraction of Smooth muscle.Section 02. (Chapter 08, Page 101)</li> </ul>	<ul> <li>https://www.kenhub.com/en/library/anat omy/smooth-musculature</li> <li>https://youtu.be/qEVRoKuoj4U</li> </ul>
Introduction to pericardium Properties of myocardium & endocardium, myocardial action potential	Describe the physiologic anatomy of myocardium Discuss properties of myocardium Discuss in detail various properties of myocardium Describe the mechanism of production of action potential and its propagation Describe excitation contraction coupling in detail Discuss propagation of electrical activity in cardiac muscle	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 14. Page 131)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 482)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. (Chapter 09, Page 114)</li> </ul>	https://youtu.be/L2Gf9cj7jBw     https://www.sciencedirect.com/topics/medicine-and-dentistry/cardiac-action-potential

Mechanism of smooth muscle contraction & its control	Explain the chemical and physical basis of smooth muscle contraction	<ul> <li>Ganong's Review of Medica Physiology by Linda S. Costanzo 6th Edition.Cellular Physiology (Chapter 1. Page 42)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 439,443)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Excitation and Contraction of Smooth muscle.Section 02. (Chapter 08, Page 103,105)</li> </ul>	<ul> <li>https://www.kenhub.com/en/library/an atomy/smooth-musculature</li> <li>https://youtu.be/qEVRoKuoj4U</li> </ul>
Regulation of myocardial activity	Describe the regulation of pumping activity of heart	Textbook of Medical Physiology by Guyton & Hall.14th Edition. Excitation and Contraction of Smooth muscle.Section 02. (Chapter 09, Page 123)	<ul> <li>https://pubmed.ncbi.nlm.nih.gov/16618         <a href="mailto:29/">29/</a></li> <li>https://www.sciencedirect.com/topics/         <a href="mailto:medicine-and-dentistry/cardiac-action-potential">medicine-and-dentistry/cardiac-action-potential</a></li> </ul>
Comparison of 3 types of muscle	Discuss differences among three types of muscle in detail	Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 444)	<ul> <li>https://training.seer.cancer.gov/anatom y/muscular/types.html</li> <li>https://youtu.be/eShBZ3-RxHA</li> </ul>
Excitatory & Conducting system of heart	<ul> <li>Describe the conductive system of heart in detail</li> <li>Enlist the various components of conductive system of heart</li> <li>Describe the mechanism of production of action potential in SA node, AV node, ventricles.also describe its propogation</li> </ul>	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Muscle (Chapter 12,Page 488)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 08,page 155,162)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Section 02. (Chapter 10, Page 127,133)</li> </ul>	<ul> <li>https://youtu.be/TnFoJ7Hhi-M</li> <li>https://teachmeanatomy.info/thorax/or gans/heart/conducting-system/</li> </ul>

## **Biochemistry Self Directed Learning (SDL)**

Topic	Learning Objectives At the end of lecture students should be able to	References						
	Protein chemistry							
Properties of amino acids& Important peptides	<ul> <li>Describe amphoteric properties of amino acids</li> <li>Discuss Post transitional amino acids and location of amino acids in proteins</li> <li>Explain Important peptides</li> </ul>	• Textbook of Mushtaq 8 <sup>th</sup> Eidtion Chapter No. 4 pg 97						
Proteins	<ul> <li>Discuss Importance of proteins</li> <li>Classify proteins</li> <li>Describe Functions of proteins</li> </ul>	• Textbook of Mushtaq 8 <sup>th</sup> Eidtion Chapter No. 4 pg 97, 98						
Primary structure of proteins	<ul><li>Describe Primary structure of protein</li><li>Discuss Peptide bond</li></ul>	• Textbook of Lippincott 8 <sup>th</sup> Eidtion Chapter No. 2 pg 14						
Secondary structure of proteins	<ul> <li>Enlist Types of secondary structure.</li> <li>Describe Secondary structure of proteins.</li> <li>Elaborate Significance of secondary structure</li> </ul>	• Textbook of Lippincott 8 <sup>th</sup> Eidtion Chapter No. 2 pg 16						
Tertiary and quaternary structure	<ul> <li>Describe Tertiary and quaternary structure of proteins</li> <li>Understand the forces stabilizing protein structure</li> </ul>	• Textbook of Lippincott 8 <sup>th</sup> Eidtion Chapter No. 2 pg 19						
Protein folding And denaturation	<ul> <li>Discuss Folding of proteins</li> <li>Describe protein misfolding</li> <li>Interpret the clinical cases related to protein misfolding</li> <li>Discuss denaturation of proteins</li> </ul>	• Textbook of Lippincott 8 <sup>th</sup> Eidtion Chapter No. 2 pg 20, 21						
Collagen and Elastin	<ul> <li>Describe structure of collagen and elastin</li> <li>Discuss differences between collagen and elastin</li> <li>Explain Synthesis of collagen</li> <li>Enlist Factor regulating and helping in strengthening of collagen</li> <li>Interpret defects of collagen synthesis and elastin</li> </ul>	Textbook of Lippincott 8 <sup>th</sup> Eidtion Chapter No. 4 pg 45,97						
Techniques for separation of proteins	Describe Techniques for separation of proteins	• Textbook of Mushtaq 8 <sup>th</sup> Eidtion Chapter No. 4 pg 104						

## **Histology Practicals Skill Laboratory (SKL)**

Practical	At The End Of This Skill Lab, Student	Learning	Teaching	Assessment
	Should Be Able To Illustrate:	Domain	Strategy	Tools
	Identify muscle under microscope	P		
Skeletal muscle	Illustrate microscopic structure of muscle	C2	Skill Lab	OSPE
	Write two points of identification	C1		
	Focus the slide	P		
	Identify muscles under microscope	P		
Cardiac muscle	Illustrate microscopic structure of muscles	C2	Skill Lab	OSPE
Smooth muscle	Write two points of identification	C1		
	Focus the slide	P		
	Identify thick skin under microscope	P		
	Illustrate microscopic structure of thick	C2	Skill Lab	OSPE
Thick skin	skin	C1		
	Write two points of identification	P		
	Focus the slide			
	Identify thin skin under microscope	P		
Thin skin	Illustrate microscopic structure of thin skin	C2	Skill Lab	OSPE
	Write two points of identification	C1		
	• Focus the slide	P		

## **Physiology Practicals Skill Laboratory (SKL)**

Practical		At The End Of This Skill Lab,	Learning	Teaching	Assessment	References
		Student Should Be Able To	Domain	Strategy	Tools	
		Illustrate:				
	•	Apparatus identification	P			
	•	Principle	C1		OSPE	
Determina	•	Procedure	C1	Skill Lab		Practical Notebook of Physiology
tion of	•	Recall composition of Diluents	C1	SKIII Luo		Second year MBBS by Dr Saqib
RBC	•	Comprehend				Sohail
count	•	Calculation on hemocytometer	C3			
	•	Recall Normal values	C1			
	•	Apparatus identification	P		OSPE	

Determina	Principle	C1	Skill Lab		Practical Notebook of Physiology
ti on of	• Procedure	C1			Second year MBBS by Dr Saqib
TLC	Recall composition of Diluents	C1			Sohail
	Comprehend Calculation on	C2			
	<ul><li>hemocytometer</li><li>Recall Normal values</li></ul>	C1			
	<ul><li>Apparatus identification</li><li>Principle</li></ul>	P C1	Skill Lab	OSPE	
Determina	• Procedure	C1	Skiii Luo		Practical Notebook of Physiology
tion of	<ul> <li>Recall composition of Diluents</li> </ul>	C1			Second year MBBS by Dr Sagib
Platelet Count	Comprehend, Calculation on hemocytometer	C2			Sohail
	Recall Normal values	C1			
Determina tion of ABO, Blood	<ul> <li>Principle</li> <li>Procedure</li> <li>Methods</li> <li>Types of blood groups</li> <li>Clinical Corelations of blood transfusion</li> </ul>	C1 C1 C1 C2 C3	Skill Lab	OSPE	Practical Notebook of Physiology Second year MBBS by Dr Saqib Sohail

## **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives		Teaching	Assessment
	At The End Of Practical Students Should Be Able To	Domain	Strategy	Tool
Color tests for detection of proteins	Perform the color tests	P	Skill Lab	OSPE
Detection of proteins by Isoelectric pH	Detect proteins by isoelectric pH	P	Skill Lab	OSPE
Fractional precipitation of proteins	Detect proteins by precipitation reactions (precipitation by full and half saturation with ammonium sulphate)	P	Skill Lab	OSPE
Chromatography	Separate proteins by Chromatography	P	Skill Lab	OSPE

## **Basic and Clinical Sciences (Vertical Integration)**

#### Content

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

# **Basic And Clinical Sciences (Vertical Integration)**

Case Based Learning (CBL)

Subject	Topic	Learning Objectives	Learning	
		At the end of the lecture the student should be able to	Domain	
Anatomy	• Traumatic Hip dislocation	aumatic Hip dislocation   Apply basic knowledge of subject to study clinical case.		
	• Fracture Of Neck Of	Apply basic knowledge of subject to study clinical case.	C3	
	Femur			
Physiology	Weight Training	Apply basic knowledge of subject to study clinical case.	C3	
	Marfan Syndrome	Apply basic knowledge of subject to study clinical case.	C3	
Biochemistry	Collagen deficiency	Apply basic knowledge of subject to study clinical case.	C3	

# Large Group Interactive Sessions (LGIS) Radiology

Topic	<b>At The End Of Lecture Students Should</b>	Learning	Teaching	Assessment
	Be Able To	Domain	Strategy	Tool
V gove of His Done	• Interpret normal x-rays of Hip bone & Lower Limb	C2	LGIS	MCQs
X rays of Hip Bone	Discuss features of different Fractures of Hip Bone & Lower Limb	C2		

#### Orthopedics

Topic	At The End Of Lecture Students Should	Learning	Teaching	Assessment
	Be Able To	Domain	Strategy	Tool
Fractures of Lower Limb	Understand the anatomical and biomechanical principles underlying fractures of the lower limb.	C2	LGIS	MCQs
	Identify and classify fractures of the lower limb through clinical assessment and radiographic interpretation			

#### **List of MSK-II Module Vertical Courses Lectures**

Sr. #	Date/Day	Week	Department	Time	Topic Of Lectures	Teachers Name & Contact #
1.	Thursday 30-05-2024	1 <sup>st</sup>	Radiology	10:20 AM – 11:20 AM	X rays of Hip Bone	
2.	Tuesday 25-06-2024	5 <sup>th</sup>	Orthopedics	10:30 AM – 11:20 AM	Fractures of Lower Limb	

### **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

#### **Content**

- Longitudinal Themes
  - o The Holy Quran Translation
  - Seerat Mubarak
  - o Biomedical Ethics & Professionalism
  - o Family Medicine
  - o Artificial Intelligence (Innovation)
  - o Early Clinical Exposure (ECE)

### **The Holy Quran Translation Lecture**

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Imaniat	<ul> <li>Describe the Concept of Tauheed</li> <li>Explain the attributes of pious.</li> <li>Discuss the attributes of Allah Almighty</li> <li>Explain Hazarat Uzair's and Hazarat Ibrahim's experience about resurrection</li> </ul>	C2	LGIS	SAQ
Ibadat	• Understand the concept of worship, mastering ritual acts, fostering a spiritual connection.	C2	LGIS	SAQ

### Seerat Mubarak

Importance of Hadees and Sunnah	<ul> <li>Discuss the meaning of Hadith and Sunnah</li> <li>Describe the importance of Hadees and Sunnah</li> </ul>	C2	LGIS	SAQ

### **Family Medicine**

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Communication Skills	• To be able to communicate with the patients keeping mind the principle of communication skills	C2	LGIS	MCQS

# **Artificial Intelligence (Innovation)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Introduction to Artificial	• Understand the fundamental concepts and applications of Artificial Intelligence (AI) in healthcare, including medical image analysis, disease prediction, and personalized treatment recommendations.	C2	LGIS	MCQS
Intelligence	• Demonstrate the ability to critically evaluate AI algorithms and their ethical implications in medical decision-making, patient care, and privacy.			

### **Biomedical Ethics & Professionalism**

	Practical Session 1						
Introduction to Professional Ethics and PM&DC Code of Conduct	Discussion will cover; Introduction to Professional Ethics and PM&DC Code of Conduct Purpose of medical code of conduct by Regulatory body PM&DC covering following subtopics What Is the 'Professional Ethics and Code of Conduct'? Why to Have the Code of Conduct? Who Needs to Follow the Code of Conduct? Who is it for? What Are the Code of Conduct Requirements?	At the end of the session students should be able to  • Cognizant with need for professional code of conduct by PM&DC.C1  • Elaborate the purpose and relevance for medical code of conduct at undergraduate level . C2	LGIS 1hr contact session in 2-4 parallel classes conducted by Senior faculty	1 MCQs of level C1 to C3 will cover this session teachings in relevant block examination in pool of total 04 MCQs. Result / marks obtained will contribute towards Internal assessment (IA) in 1st Prof. MBBS exam.	PMDC Code of Ethics: http://www.pmdc.org.pk/LinkCl ick.aspx?fileticket=v5WmQYM vhz4%3D&tabid=102∣=55 4		
History of Medical	Discussion on Health Research ethics focusing;  •Historical perspective of Tuskegee studies, Willow brook Experiment	At the end of the session students should be able to;  • Explain the meaning of the term	LGIS 1hr contact session in 2-4 parallel classes,	1 MCQs of level C1 to C3 will cover this session teachings in relevant block	Guidelines and Teachers Handbook for Introducing Bioethics to Medical and Dental Students		
Д,	•Codes of medical ethics: traditional	"ethics".C1	Conducted by	examination in pool of	http://nbcpakistan.org.pk/assets/		

	foundations and contemporary practice		Senior faculty.	total 04 MCQs.	may-16-bioethics-facilitator-
	Nuremburg code, Belmont report,	• Describe the historical perspective of	Schol faculty.	Result / marks obtained	bookmay-16%2C-2017.pdf
	Declaration of Helsinki and importance of	global development of medical ethics.		will contribute towards	The Nuremberg Code:
	historical background of ethics in current	C1		Internal assessment	http://www.hhs.gov/ohrp/archiv
	research trends			(IA) in 1 <sup>st</sup> Prof. MBBS	e/nurcode.html
	General ethical principles including	Describe the codes of medical ethics		exam.	10 WMA Declaration of
	explanation of 04 basic principles of	and their implications.C1			Helsinki:
	Beneficence, non-maleficence, respect and	r			http://www.wma.net/en/30publi
	justice.	• Recognize ethical issues relevant to			cations/10policies/b3/
	- Interpretation research ethics for;	the case situation and apply the ethical			CIOMS Guidelines:
	- Informed consent and confidentiality in	codes as appropriate. C2			http://www.cioms.ch/publicatio
	research HR				ns/layout_guide2002.pdf.
		• Discuss the development of			Nuffield Council on Bioethics
		indigenous ethical codes in the South-			Guidelines:
		East Asian Region. C2.			http://www.sirc.org/news/nuffie
		<ul> <li>Demonstrate sensitivity to</li> </ul>			<u>ld.shtml</u>
		cultural diversity in medical care.C3			
	Discussion will cover basic elements of	At the end of the session students	Case based		- Real life scenarios in form
	Laboratory Ethics focusing;	should be able to;	discussion in 2 hr	Assignment based	of Case base learning
	• Importance of medical professionalism for		contact session in	assessment under	/problem based learning
	the medical student; including	• Understand the importance of taking	4-6 parallel classes	aggregate Marks	(PBL)
Š	respect and gratitude towards	permission before performing	conducted by	(Internal Assessment)	To be share with students
- hic	colleagues	procedures (drawing blood,	faculty of		one week before the session
Ē	• Code of conduct: Collaboration, partnership,	administering injections etc.) during	respective	Assignment to be	
ory	Teamwork, Maintaining dress code, religion	laboratory sessions .A1	departments	uploaded on LMS	Introduction to criteria for
rat	obligations of medical doctor, focus on	Ch D 141-	D -11		assessment of behavior, code of
Laboratory Ethics	physicians' character, virtues and duties	• Show Respects other health	Role plays		conduct and professionalism at RMU
ļ Ä	Delineate the ethical consideration while	professional team members and complete assigned task in professional	Reflective writing		RIVIU
	performing procedures on real patients or	manner.A1	Kenecuve withing		
	simulated patients in Laboratory setting	•Employ collaborative negotiation to			
	simulated patients in Laboratory setting	resolve conflict, anger, confusion and			
		misunderstanding. <b>A2</b>			
		misunderstanding. A2	1		

### **Behavioural Sciences**

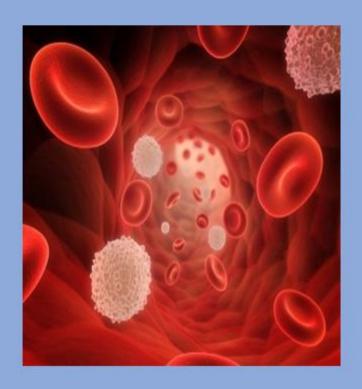
Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Rights and Responsibilities	➤ To be able to identify and differentiate own rights and rights of the patients.	C2	LGIS	
of patients and doctors	> To apply this knowledge in clinical settings	C2	CBL	MCQS

### **List of MSK-II Module Spiral Courses Lectures**

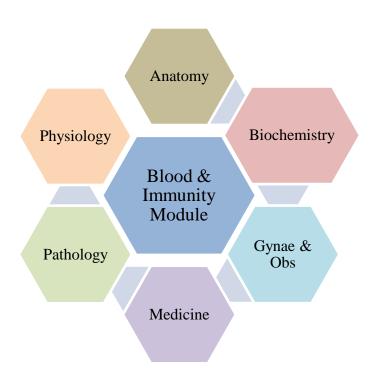
Sr. #	Date/Day	Week	Department	Time	Topic Of Lectures	Teachers Name & Contact #
1.	Friday 31-05-2024	1 <sup>st</sup>	Seerat Mubarak	09:00 AM – 10:00 AM	Importance of Hadees and Sunnah	Molana Abdul Waahid (0341-5444667)
2.	Friday 31-05-2024	1 <sup>st</sup>	Family Medicine	11:00 AM – 12:00 PM	Communication and consultation skills in Family Medicine Practice	Dr. Sadia Azam Khan
3.	Friday 07-06-2024	2 <sup>nd</sup>	Quran Translation	11:00 AM – 12:00 PM	Imaniat-I, Ibadat-II	Molana Abdul Waahid (0341-5444667)  Mufti Naeem Sherazi (0300-5580299)
4.	Friday 14-06-2024	3 <sup>rd</sup>	Quran Translation	10:00 AM – 11:00 AM	Imaniat -I , Ibadat-II	Mufti Naeem Sherazi (0300-5580299)  Molana Abdul Waahid (0341-5444667)
5.	Thursday 20-06-2024	4 <sup>th</sup>	Behavioral Sciences	11:20 AM – 12:10 PM	Communication Skills	Dr. Arsalan Manzoor
6.	Friday 21-06-2024	4 <sup>th</sup>	Quran Translation	09:00 AM – 10:00 AM	Ibadat-III Immaniat-II	Molana Abdul Waahid (0341-5444667)  Mufti Naeem Sherazi (0300-5580299)
7.	Friday 21-06-2024	4 <sup>th</sup>	Quran Translation	10:00 AM – 11:00 AM	Ibadat-IV, Immaniat-III	Mufti Naeem Sherazi (0300-5580299) Molana Abdul Waahid (0341-5444667)
8.	Saturday 22-06-2024	4 <sup>th</sup>	Biomedical Ethics	11:20 AM – 12:10 PM	Introduction to Professional Ethics and PM&DC Code of Conduct	Dr. Aneela (Even) Dr. Kashif (Odd)
9.	Monday 24-06-2024	5 <sup>th</sup>	Artificial Intelligence	10:30 AM – 11:20 AM	Introduction to Artificial Intelligence	Prof. Dr. Riaz Ahmed
10.	Tuesday 25-06-2024	5 <sup>th</sup>	Behavioral Sciences	09:00 AM – 10:10 AM	Rights and responsibilities of patients and doctors	
11.	Tuesday 26-06-2024	5 <sup>th</sup>	Biomedical Ethics	11:20 AM – 12:10 PM	History of Medical Ethics	Dr. Arsalan Even Dr. Maria Odd



# **Blood & Immunity Module**



### **Integration of Disciplines in Blood & Immunity Module**



### **Spiral / General Education Cluster Courses**

Blood & Immunity
Module

Bioethics & Professionalism

Family Medicine

The Holy Quran Translation

# **Discipline Wise Details of Modular Contents**

Block	Subjects	Embryology	Histology	<b>Gross Anatomy</b>	CBL	SDL
	• Anatomy	<ul> <li>Development of pharyngeal arches</li> <li>Development of spleen</li> <li>Development of thymus</li> </ul>	<ul><li>Spleen</li><li>Thymus</li><li>Lymph nodes</li><li>Tonsils</li></ul>	Lower Limb • Posterior compartment of leg to foot	<ul><li>Ankle sprain</li><li>Flat foot</li></ul>	<ul> <li>Posterior compartment of leg and flexor retinaculum</li> <li>Neurovascular organization of posterior compartment of leg</li> <li>Foot joints</li> <li>Ankle joints</li> <li>Sole of foot</li> <li>Spleen</li> <li>Gait cycle</li> </ul>
II	• Physiology	<ul> <li>Hemoglobin &amp; Hem</li> <li>Red cell fragility, ES</li> <li>Fate of RBCs &amp; Jau</li> <li>Types of immunity,</li> <li>Physiology of acquir</li> <li>Composition of bloc</li> <li>WBCs classification</li> <li>Platelet formation &amp;</li> <li>Blood coagulation</li> <li>Concept of intravase thrombocytopenia)</li> <li>Thromboembolic corof blood clotting out</li> <li>Physiological mecha</li> <li>Role of Hypothalam</li> </ul>	Physiology of innate red immunity B-Cell red immunity T-Cell od & Hemopoiesis a & formation. Neutrox function. hemostasis cular anticoagulants a endition (DVT, Pulmotside the body) anism of temperature regulation (Feverouping system system and Erythroble azards	on Metabolism es, Anemia & polycythe e immunity tolerance & es. Allergy and Hyperser ophils, Eosinophils & B es, blood coagulation tes and bleeding disorders ( conary Embolism, DIC) regulation gulation er, Heat stroke, Exposu	auto immunity  Institute reactions, A  Basophils and their p  Sts (BT, CT, PT, AP  (Vit K deficiency, h  Anticoagulant thera	Auto-immune diseases and AIDS properties PTT and INR semophilia and apy (Heparin, warfarin, Prevention

Biochemistry	Heme synthesis				
	Porphyria				
	Breakdown of hemoglobin				
	• Jaundice				
	• Blood				
	Structure of hemoglobin and myoglobin				
	Types of Hemoglobin				
	Oxygen dissociation curve.				
	Abnormalities in Hemoglobin.				
	Hemoglobinopathies				
	Plasma proteins				
	Acute phase proteins & Albumin				
	Haptoglobin and transferring.				
	Ferritin and hemosiderin				
	Ceruloplasmin.				
	Antiproteases and amyloidosis				
	• Immunoglobulins				
	• AIDs				
	• Folic acid.				
	• Vitamin B12				
	• Iron				
	Spiral Courses				
Bioethics & Professionalism	<ul><li>Activity I</li><li>Activity II</li></ul>				
	Activity III				
Family Medicine	Aproach to a Patient Aneamia				
The Holy Quran Translation	Muaamlaat				
The Hory Quran Translation	• Muaasharat				
	Vertical components				
<ul> <li>Pathology</li> </ul>	Mediators of Inflammation				
24.1.	<ul><li>(Medicine)</li><li>Anemia</li></ul>				
Medicine	<ul><li>Jaundice</li></ul>				
Gynae & Obs	Rh Incompatibility And Its Significance -Immune				
Early Clinical Exposure (ECE)					
Medicine	Immunodeficiency cases				

	Hepatosplenomegaly				
Lymphadenopathy					
<ul> <li>Pediatrics</li> </ul>	Neonatal Jaundice				
ABO/ Rh Incompatibility					
	Lymphadenopathy/ Hepatosplenomegaly				
Pathology Laboratory					
	Microcytosis				
	• Leukocytosis				
	• Lymph node				
	Bone Marrow				
Clinical Themes					
Anemia					
• Thalassemia					

### **Blood and Immunity Module Team**

Module Name : Blood and Immunity Module

Dr. Sadia Khan

Duration of module : 05 Weeks Coordinator : Dr. Rahat

Lectures

Focal Person Family Medicine

Co-coordinator : Dr. Kamil Tahir Reviewed by : Module Committee

	Module Comr	nittee		M	odule Task Force Team
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Rahat (APWMO of Biochemistry)
2.	Chairperson Anatomy & Dean	Prof. Dr. Ayesha Yousaf	2.	DME Focal Person	Dr. Farzana Fatima
	Basic Sciences				
3.	Director DME	Prof. Dr. Ifra Saeed	3.	Co-coordinator	Dr. Ali Raza (Senior Demonstrator of Anatomy)
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Uzma Zafar (APWMO of Biochemistry)
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Kamil Tahir (Senior Demonstrator Physiology)
6.	Focal Person Anatomy First Year	Asso. Prof. Dr. Mohtashim Hina			
	MBBS				
7.	Focal Person Physiology	Dr. Sidra Hamid		DM	IE Implementation Team
			1.	Director DME	Prof. Dr. Ifra Saeed
8.	Focal Person Biochemistry	Dr. Aneela Jamil	2.	Assistant Director DME	Dr. Farzana Fatima
9.	Focal Person Pharmacology	Dr. Zunera Hakim	3.	Implementation Incharge 1st & 2 <sup>nd</sup>	Prof. Dr. Ifra Saeed
				Year MBBS	Dr. Farzana Fatima
					Dr. Saira Aijaz
10.	Focal Person Pathology	Dr. Asiya Niazi	4.	Editor	Muhammad Arslan Aslam
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom			
13.	Focal Person Quran Translation	Dr. Fahad Anwar			

### **Module IV- Blood and Immunity Module**

#### Rationale

Blood is a specialized connective tissue that delivers necessary substances such as nutrients and oxygen to the cells and transports metabolic waste products away from those same cells. Blood accounts for 8% of the human body weight. The average adult has a blood volume of roughly 5 liters, composed of plasma and several kinds of cells (occasionally called corpuscles); these formed elements of the blood are erythrocytes (red blood cells, RBCs), leukocytes (white blood cells), and thrombocytes (platelets). By volume, the red blood cells constitute about 45% of whole blood, the plasma about 54.3%, and white cells about 0.7%.

White blood cells are part of the body's immune system; they destroy and remove old or aberrant cells and cellular debris, as well as attack infectious agents (pathogens) and foreign substances.

The rationale behind is to introduce the students the basic constituents, functions and transport of various substances through blood.

#### **Module Outcomes**

By the end of the module, students will be able to:

#### Knowledge

- This module is expected to build students basic knowledge about normal structure, organization, functions and development of blood and immunity system.
- Used technology based Medical Education including.

#### **Artificial Intelligence**

• Appreciate concept and importance of **Biomedical Ethics**,

Diomedical Editics

Research

**Family Medicine** 

#### **Skills**

- Demonstrate effective skill for performing and interpreting various laboratory tests like Haemin crystal test.
- Demonstrate awareness of ethical, legal and social implecation of issues related to bioethics.

#### **Attitude**

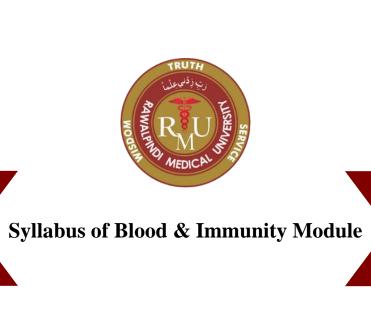
• Demonstrate professional attitude, team-building spirit and good communication specially in small group discussions.

This module will run in 5 weeks duration. Instructional strategies are given in the timetable and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy



### **Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)**

### **Anatomy Large Group Interactive Session (LGIS)**

Topic	At the End of The Session Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
	Classify lymphoid tissue	C2		
	Define diffuse lymphoid tissue, nodular lymphoid tissue and lymphoid organs	C1		
	Discuss the histological features of lymph node	C2		MCQ
(Histology)	• Enlist functions of lymph node	C1	LGIS	SAQ
Lymph node	• Understand the supporting elements of lymph node	C2		VIVA
J F	Describe filtration through lymph node	C2		VIVA
	Discuss importance of high endothelial venules in lymph node	C2		
	Discuss the clinical correlation of lymph node	C3		
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
	Describe the location and functions of thymus	C1		
	• Enumerate different types of reticuloepithelial cells	C1		
	Describe microscopic structure of thymus	C2		
/TT' ( 1 )	• Compare the histological structure of thymus and other lymphoid organs	C2	I GIG	MCQ
(Histology)	Discuss blood thymus barrier	C2	LGIS	SAQ VIVA
Thymus & Tonsil	Describe general histological structure of tonsils	C2		VIVA
	Differentiate palatine, lingual, and pharyngeal tonsils histologically	C2		
	Discuss the clinical correlation of thymus	C3		
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Read a research article	C3		
	Describe the location and functions of spleen	C2		

	Describe microscopic structure of spleen	C2		
(Histology)	Differentiate between red and white pulp of spleen	C2		MCQ
Spleen	Discuss blood circulation through spleen	C2	LGIS	SAQ
	Discuss the clinical correlation of spleen	C3		VIVA
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Read a research article	C3		
	Define pharyngeal arches and pouches	C1		
(Embryology)	Discuss the components of pharyngeal arches and pouches	C2		MCQ
Development of	Describe the development and fate of each pharyngeal arch and pouches	C2	LGIS	SAQ
Pharyngeal arches	Discuss the clinical correlation of pharyngeal arches and pouches	C3		VIVA
& pouches	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Read a research article	C3		

# **Physiology Large Group Interactive Session (LGIS)**

Topics	At the end of lecture students	Learning	Teaching	Assessment	
	should be able to:	<b>Domains</b>	Strategy	Tools	
Composition of blood & Hemopoiesis	1.Describe composition and general functions of blood 2.Explain the role of bone marrow in hemopoiesis and erythropoiesis 3.Draw steps of hemopoiesis 4. Define committed and uncommitted cells	1.C2 2. C2 3. C3 4. C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition. Section05, Cardiovascular Physiology (Chapter 31, Page 553)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 547,548)</li> <li>Physiological Basis of Medical Practice by Best &amp;</li> </ul>

					Taylor's.13 <sup>th</sup> Edition. Section 03, Blood (Chapter 19, Page 347) (Chapter 20, Page 356)  • Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. Red blood cells, Anemia and Polycythemia. Section 06. (Chapter 33, Page 439)	
Plasma Proteins	1.Enumerate plasma proteins, their properties, sites of production and their functions.  2.Explain effects of deficiency of plasma proteins  3.Discuss conditions associated with decreased production and increased excretion of plasma proteins	C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition.         Section05, Cardiovascular Physiology (Chapter 31, Page 563)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 547)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition.         Section 03, Blood (Chapter 19, Page</li> </ul>	https://www.ncbi.nlm.nih.gov/boo ks/NBK531504/ 2.https://accessmedicine.mhmedic al.com/content.aspx?bookid=1366 &sectionid=73247095348,353)
WBCs classification & formation. Neutrophils, Eosinophils &Basophils and their properties	<ol> <li>Enumerate and explain         various types of leukocytes         and steps of leucopoiesis.</li> <li>Explain the characteristics         and functions.</li> <li>Conditions in which these         cells are increased and         decreased.</li> <li>Leukemias and their effects         on the body</li> </ol>	C1/C2 C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	Textbook of Medical     Physiology by Guyton &     Hall.14 <sup>th</sup> Edition.     Resistance of the body to     Infection. Section 06.     (Chapter 34, Page     449,456,457)	https://www.ncbi.nlm.nih.gov/pm c/articles/PMC9777002/ 2.https://youtu.be/TelOcCkZX7c

Stages of erythropoiesis & factors affecting erythropoiesis	<ol> <li>Elaborate Morphological features of RBCs.</li> <li>Describe the stages of production of RBCs.</li> <li>Recall Life span of RBCs</li> <li>Enumerate and explain factors which affect erythropoiesis.</li> <li>Enlist sites of production of erythropoietin</li> <li>Describe recombinant erythropoietin.</li> <li>Explain mechanism of release and action of erythropoietin</li> </ol>	C2 C1 C1 C2 C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition. Section05, Cardiovascular Physiology (Chapter 31, Page 553)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 547,548)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. Section 03, Blood (Chapter 19, Page 347) (Chapter 20, Page 356)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>Edition. Red blood cells, Anemia and Polycythemia. Section 06. (Chapter 33, Page 439)</li> </ul>	https://accessmedicine.mhmedical .com/content.aspx?bookid=3047& sectionid=255121548 2.https://youtu.be/cm8IK24RRvA
Monocytes - macrophage system & lymphocytes	<ol> <li>Explain the characteristics and functionsof monocytes.</li> <li>Explain monocytemacrophage system; importance</li> </ol>	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition. Section01, Immunity, Infection and Inflammation (Chapter 03, Page 67)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. Section 03, Blood (Chapter 21, Page371) (Chapter 22, Page 387)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section</li> </ul>	https://www.sciencedirect.com/to pics/pharmacology-toxicology- and-pharmaceutical- science/mononuclear-phagocyte- system 2.https://bmcbiol.biomedcentral.c om/articles/10.1186/s12915-017- 0392-4

					06. (Chapter 34, Page 450- 452)	
Hemoglobin & Hemoglobinopathies, Iron Metabolism	<ol> <li>Discuss details about iron metabolism in body including iron absorption and storage.</li> <li>Understand the structure, synthesis and functions of hemoglobin and its types.</li> <li>Enlist different types of hemoglobinopathies</li> </ol>	C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition. Section05, (Chapter 31, Page 555)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 553)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. (Chapter 23, Page 407,409)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 446,447)</li> </ul>	https://www.sciencedirect.com/to pics/medicine-and-dentistry/red- blood-cell-indices 2.https://youtu.be/QUHqYVK -Nhg 3. https://youtu.be/mOrRJBqm744
Process of inflammation and Lines of defense during inflammation	<ol> <li>Describe the role of neutrophils and monocytes in inflammation.</li> <li>Elaborate Lines of defense</li> </ol>	1.C1, C2 2. C1, C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section01, Immunity, Infection and Inflammation (Chapter 03, Page 81)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. Section 03, Blood) (Chapter 22, Page 384)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 454)</li> </ul>	https://youtu.be/WFm9j1rNkQs .https://en.wikipedia.org/wiki/Infl ammation .https://www.verywellhealth.com/ signs-of-inflammation-4580526

Red cell fragility, ESR & Red cell indices, Anemia & polycythemia	<ol> <li>Define RBC fragility; importance; conditions in which fragility is changed.</li> <li>Discuss various blood indices, give their formulae,co-related with different types of anemias.</li> <li>Enumerate various types of anemias and polycythemias.</li> <li>Dliscuss details about various types of anemias and polycythemia and their effect on circulatory system.</li> </ol>	C1 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition. Section05, (Chapter 31, Page 555)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 553)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. (Chapter 23, Page 407,409)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 446,447)</li> </ul>	https://www.sciencedirect.com/to pics/medicine-and-dentistry/red- blood-cell-indices 2.https://youtu.be/QUHqYVK -Nhg 3. https://youtu.be/mOrRJBqm744
Platelet formation & function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)	<ol> <li>Explain thrombocytopoiesis.</li> <li>Describe functions of platelets</li> <li>Define hemostasis.</li> <li>Explain steps of hemostasis</li> </ol>	C2 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 564) (Chapter 03, Page 79)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 558)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 24, Page 413)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 06. (Chapter 37, Page 477,487)</li> </ul>	https://my.clevelandclinic.org/heal th/symptoms/21999-hemostasis https://www.sciencedirect.com/to pics/neuroscience/hemostasis

Fate of RBCs & Jaundice	<ol> <li>Give life span of RBCs and explain their destruction.</li> <li>Describe various types, compare and differentiate between various types of jaundice</li> </ol>	C1, C2 C1, C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition. Section05, (Chapter 31, Page 555)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 553)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. (Chapter 23, Page 407,409)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 446,447)</li> </ul>	https://www.sciencedirect.com/to pics/medicine-and-dentistry/red- blood-cell-indices 2.https://youtu.be/QUHqYVK -Nhg 3. https://youtu.be/mOrRJBqm744
Blood coagulation	Explain hemostasis,     mechanism of blood     coagulation, fibrinolysis and     anticoagulants	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 559)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. (Chapter 24, Page 417)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 37, Page 479)</li> </ul>	https://youtu.be/gExUCrpAKyQ https://medlineplus.gov/lab- tests/coagulation-factor-tests/
Types of immunity, Physiology of innate immunity tolerance & auto immunity	<ol> <li>Define immunity and its types.</li> <li>Compare and contrast innate and acquired immunity.</li> <li>Difference between passive and active immunity</li> </ol>	C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment,	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition. Section01, Immunity, Infection and Inflammation (Chapter 03, Page 67)</li> <li>Physiological Basis of Medical Practice by Best &amp;</li> </ul>	https://www.sciencedirect.com/to pics/pharmacology-toxicology- and-pharmaceutical- science/mononuclear-phagocyte- system

				MST based Assessment) OSPE	Taylor's.13 <sup>th</sup> Edition. Section 03, Blood (Chapter 21, Page 371) (Chapter 22, Page 387)  • Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. Section 06. (Chapter 34, Page 450-452)	2.https://bmcbiol.biomedcentral.c om/articles/10.1186/s12915-017- 0392-4
Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)	<ol> <li>Explain Intravascular coagulation.</li> <li>Discuss Bleeding disorders.</li> <li>Enlist Types of hemophilia</li> </ol>	1.C2 2.C2 3. C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 559)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. (Chapter 24, Page 417)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 37, Page 479)</li> </ul>	https://youtu.be/gExUCrpAKyQ https://medlineplus.gov/lab- tests/coagulation-factor-tests/
Physiology of acquired immunity B-Cells	<ol> <li>Enumerate various types of lymphocytes</li> <li>Discuss their important characteristics and</li> <li>Explain the mechanism of preprocessing</li> </ol>	C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition.         Section01, Immunity,         Infection and Inflammation         (Chapter 03, Page 67)</li> <li>Physiological Basis of         Medical Practice by Best &amp;         Taylor's.13<sup>th</sup>Edition. Section         03, Blood (Chapter 21,         Page371) (Chapter 22, Page 387)</li> <li>Textbook of Medical         Physiology by Guyton &amp;         Hall.14<sup>th</sup> Edition. Section         06. (Chapter 34, Page 450-</li> </ul>	https://www.sciencedirect.com/to pics/pharmacology-toxicology- and-pharmaceutical- science/mononuclear-phagocyte- system 2.https://bmcbiol.biomedcentral.c om/articles/10.1186/s12915-017- 0392-4

					452)	
Thromboembolic condition (DVT, Pulmonary Embolism, DIC) Anticoagulant therapy (Heparin, warfarin, Prevention of blood clotting outside the body)	<ul> <li>Discuss different         Thromboembolic Conditions     </li> <li>Explain Pulmonary Embolism and clinical correlation</li> <li>Enlist different         Anticoagulant therapy     </li> </ul>	C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 559)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. (Chapter 24, Page 417)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 37, Page 479)</li> </ul>	https://youtu.be/gExUCrpAKyQ https://medlineplus.gov/lab- tests/coagulation-factor-tests/
Physiology of acquired immunity T-Cells. Allergy and Hypersensitivity reactions, Auto-immune diseases and AIDS	<ol> <li>Define clone and explain the roles of T and B lymphocyte clones in immunity</li> <li>Discuss the mechanisms involved in Immune Tolerance</li> <li>Compare Type I and Type IV hypersensitivity reactions</li> <li>Describe the process of immunization</li> <li>Understand role of T-lymphocytes in transplants</li> <li>Identify different types of tissue grafts</li> </ol>	C1, C2 C2 C2 C1 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>Edition. Section01, Immunity, Infection and Inflammation (Chapter 03, Page 67)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>Edition. Section 03, Blood (Chapter 21, Page 371) (Chapter 22, Page 387)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 450-452)</li> </ul>	https://www.sciencedirect.com/to pics/pharmacology-toxicology- and-pharmaceutical- science/mononuclear-phagocyte- system 2.https://bmcbiol.biomedcentral.c om/articles/10.1186/s12915-017- 0392-4
Physiological mechanism of temperature regulation	Explain Concept of temperature     Discuss Physiological mechanism of temperature regulation	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment,	• Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. Section 06. (Chapter 73, Page 889- 936)	https://shop.elsevier.com/boo ks/guyton-and-hall- textbook-of-medical- physiology/hall/978-0-323- 59712-8

				MST based Assessment) OSPE		
ABO & Rh Blood grouping system	<ol> <li>Enlist Blood group and its types</li> <li>Explain Rh Blood Grouping System</li> </ol>	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 558) (Chapter 36, Page 473)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 25, Page 432)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 06. (Chapter 36, Page 471)</li> </ul>	https://www.sciencedirect.com/to pics/agricultural-and-biological- sciences/abo-blood-group-system https://youtu.be/wfqnNuYIY78
Role of Hypothalamus in temperature regulation	<ol> <li>Discuss Role of         Hypothalamus in         temperature regulation</li> <li>Explain Temperature         Regulating centers</li> </ol>	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. Section 06. (Chapter 73, Page 889- 936)	https://shop.elsevier.com/books/ guyton-and-hall-textbook-of- medical-physiology/hall/978-0- 323-59712-8
Rh Blood grouping system and Erythroblastosis fetalis	<ol> <li>Discuss Rh Blood Grouping System</li> <li>Explain Erythroblastosis fetalis</li> <li>Discuss Clinical correlation</li> </ol>	C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 558) (Chapter 36, Page 473)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 25, Page 432)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 06.</li> </ul>	https://www.sciencedirect.com/to pics/agricultural-and-biological- sciences/abo-blood-group-system https://youtu.be/wfqnNuYIY7 <u>8</u>

					(Chapter 36, Page 471)	
Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold)	<ol> <li>Discuss Disorders of temperature regulation</li> <li>Explain Concept of Fever</li> <li>Clinical correlation Of Heat Stroke</li> </ol>	1.C2 2.C2 3.C3	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	• Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. Section 06. (Chapter 73, Page 889- 936)	https://shop.elsevier.com/books/ guyton-and-hall-textbook-of- medical-physiology/hall/978-0- 323-59712-8
Blood transfusion hazards. Tissue and organ transplantations	<ol> <li>Discuss Blood transfusion hazards.</li> <li>Explain Effect of blood transfusion on various organs</li> <li>Explain Tissue and organ transplantations</li> </ol>	C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section05, (Chapter 31, Page 558) (Chapter 36, Page 473)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 25, Page 432)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 06. (Chapter 36, Page 471)</li> </ul>	https://www.sciencedirect.com/to pics/agricultural-and-biological- sciences/abo-blood-group-system https://youtu.be/wfqnNuYIY78

### **Biochemistry Large Group Interactive Session (LGIS)**

Topics	At the end of lecture students should be able to	Learning	Teaching	Assessment
		Domain	Strategy	Tool
D1 1	Enlist various functions performed by blood.	C1	I CIG	MCO
Blood	Describe Composition of blood.	C2	LGIS	MCQs
Structure of	Describe Structure of hemoglobin	C2		SAQs
hemoglobin and	Describe structure of hemogrobin     Describe structure of myoglobin.	C2	LGIS	MCQs
myoglobin		C2	LOIS	SAQs
m, ogroom	Discuss Biochemical roles of hemoglobin and myoglobin.      Faliat various types of Harra clabia.	C1		21102
Types of Hemoglobin	Enlist various types of Hemoglobin.  Passible Importance of home and clobin components.	C2	LGIS	MCQs
Types of Hemogroum	Describe Importance of heme and globin components      Interpret importance of III A 1a in diagnosis of Dishetes	C2	LOIS	SAQs
Ovven dissociation	• Interpret importance of HbA1c in diagnosis of Diabetes	C2		
Oxygen dissociation curve.	Discuss Importance of oxygen dissociation curve.    Contract   Contract		LGIS	MCQs SAQs
curve.	Enlist various factors affecting the curve.	C1 C2	LOIS	SAQS
Abnormalities in	Elaborate congenital abnormalities in structure of	C2	LGIS	MCQs SAQs
Hemoglobin.	Hemoglobin.	C1		
Hemogroom.	<ul> <li>Enlist Structural defects of hemoglobin</li> <li>Discuss Preventive measures.</li> </ul>	C2		
		C2		
	Discuss hemoglobinopathies.  - Enlist Types of the lessential.  - Types of the lessential.	C1		MCQs
Hemoglobinopathies	Enlist Types of thalassemia.  Programmer Types of thalassemia.	C2	LGIS	SAQs
Tremogroomopatmes	Discuss Familial counseling.  Eld a Recommendation of the second of		2010	
II ama ayuuthaaia	Elaborate Preventive measures.	C2 C2		
Heme synthesis	Describe enzymatic regulation of heme synthesis	C2	LGIS	MCQs
Porphyria	Discuss various types of porphyria	C2	LOIS	SAQs
Breakdown of	• Elaborate steps in the breakdown of hemoglobin.	C2		
hemoglobin	Describe Steps in synthesis of Bilirubin	C2	LGIS	MCQs
	Recall Normal level of S. Bilirubin.	C1		SAQs
Jaundice.	Define jaundice.	C1		
	Recall normal level of Bilirubin	C1	LGIS	MCQs
	• Enlist types of Jaundice.	C1		SAQs

	• Describe Biochemical tests to distinguish various types of jaundice.	C2	LGIS	
	• . Describe Physiological Jaundice	C2		
	Describe plasma proteins.	C2		
Plasma proteins	Discuss Biochemical role of various plasma proteins.	C2		MCQs
	Recall normal levels of plasma proteins	C1	LGIS	SAQs
	• Illustrate Role of A/G ratio.	C3		
	Enlist various proteins raise in inflammation.	C1		
Acute phase proteins	Describe Role of albumin.	C2	LGIS	MCQs
& Albumin	• Discuss Role of C- reactive protein.	C2		SAQs
Haptoglobin and	Describe Structure of Haptoglobin and transferrin.	C2		MCQs
transferring	• Discuss biochemical Role of Haptoglobin and transferrin.	C2	LGIS	SAQs
Ferritin and	Describe biochemical role of ferritin and hemosiderin.	C2		MCQs
hemosiderin	Describe Hemosiderosis.	C2	LGIS	SAQs
	Describe biochemical role of ceruloplasmin.	C2		MCQs
Ceruloplasmin.	• Discuss Wilson's disease.	C2	LGIS	SAQs
	• Recall Sources of iron.	C1		MCQs
Iron	Describe Transport and absorption of iron.	C2	LGIS	SAQs
	• Discuss hyper and hypo functions of iron.	C2		
	Describe Structure of Immunoglobulin.	C2		
Immunoglobulins	• Discuss biochemical role of various Immunoglobulin.	C2	LGIS	MCQs
	• Elaborate Class switching.	C2		SAQs
	Define AIDs	C1		
AIDs	Describe Immunological defects in AIDs.	C2	LGIS	MCQs
	Discuss various preventive measures.	C2		SAQs
	Recall Sources of folic acid.	C1		
Folic acid.	Discuss deficiency effects of folic acid	C2		MCQs
	Describe biochemical role of folic acid.	C2	LGIS	SAQs
	Recall Recommended Dietary allowance.	C1		
	• Recall Sources of Vitamin B12	C1	LGIS	MCQs
Vitamin B12	Describe biochemical role of vitamin B12	C2		SAQs
	Discuss Deficiency effects of B12	C2		

# **Anatomy Small Group Discussion (SGDs)**

Topic	At the End Of The Session Students Should Be Able To:	Learning Domains	Teaching Strategy	Assessment Tools
	Illustrate cutaneous innervation	C2		
	Describe superficial fascia & deep fascia.	C2		
Posterior	Discuss superficial and deep muscle groups in posterior compartment	C2	225	MCQ SAQ VIVA
Compartment of Leg (muscles) and	• Tabulate origin, insertion, nerve supply and action of all muscles of posterior compartment of leg	C2	SGD, Skill Lab	
flexor retinaculum	• Discuss ruputured calcaneal tendon, calcaneal bursitis and accessory soleus muscle	C3		OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
Posterior	• Describe origin, course relations, branches and tributaries of neurovascular bundle	C2		MCQ
Compartment of	Discuss superficial veins i.e long and short saphenous veins	C2	SGD,	SAQ
Leg	Palpate the posterior tibial pulse	C3	Skill Lab	VIVA
(Neurovascular	Correlate the clinical conditions	C3		OSPE
organization)	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	• Enumerate the bones of foot	C1		
	Identify different bones of foot	C1		
	Discuss bony features and muscle attachment	C2	SGD,	MCQ
Bones of Foot	• Discuss fracture of metatarsals and os trigonum, avascular necrosis of head of talus	C3	Skill Lab	SAQ VIVA
	Correlate the clinical conditions	C3		OSPE
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		

	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Tabulate muscle on the dorsal aspect of foot	C2		
	Describe blood supply and nerve supply	C2		
Dorsum of foot	Discuss cutaneous innervation of dorsum of foot	C2	SGD,	MCQ
	Palpate the dorsalis pedis artery on dorsum of foot	C3	Skill Lab	SAQ
	• Discuss other clinicals related to the dorsum of the foot	C3		VIVA OSPE
	Correlate the clinical conditions	C3		OSFE
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Describe the articular surfaces of ankle joint	C2		
Ankle Joint	Describe the attachment of capsule	C2		
	• Enumerate the ligaments	C1		MCQ
	Discuss the movements possible at ankle joint and muscles producing them	C2	Skill Lab	SAQ
	Discuss ankle sprain	C3		VIVA
	Discuss different types of ankle injuries	C3		OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Classify the joints of foot	C2		
	• Discuss the articular surfaces, joint capsules, ligaments, movements and muscles	C2		
	producing movements			MCQ
Joints of Foot	Discuss major ligaments in detail	C2	SGD,	SAQ
	Discuss tibial nerve entrapment	C3	Skill Lab	VIVA
	Discuss club foot, claw foot and other clinical conditions	C3		OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3	]	

	Read a research article	C3		
	• Identify Surface landmarks	C1		
	• Describe cutaneous innervation of sole of foot	C2		
a 1 aa	• Describe Plantar aponeurosis its attachments	C2	SGD,	MCQ
Sole of foot	• Discuss flexor retinaculum	C2	Skill Lab	SAQ
(Muscles)	• Discuss muscles in different layers of foot with origin, insertion, nerve supply and actions	C2		VIVA OSPE
	Correlate the clinical conditions	C3	]	
	Understand the preventive and curative health care measures	C3	]	
	Practice the principles of Bioethics	C3	]	
	Apply strategic use of AI in health care	C3	]	
	Read a research article	C3	]	
	• Enlist nerves and arteries present in sole of foot	C1		
	Discuss route and relations of neurovascular bundle in sole of foot	C2	SGD, Skill Lab	MCQ SAQ
Sole of foot	• Describe the formation of vascular arches of foot along with clinicals	C2, C3		
(Neurovascular	Discuss plantar fasciitis	C3		
Organization)	Correlate the clinical conditions	C3		VIVA
	• Understand the preventive and curative health care measures	C3		OSPE
	Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	• Read a research article	C3		
	• Classify the arches of foot	C2		
	• Describe different components of arches of foot	C2		MCQ
Arches of Foot and	• Discuss stability factors of arches of foot	C2		SAQ
Gait Cycle	• Discuss pes planus (flat foot), club foot and other clinicals	C3	SGD,	VIVA
	• Discuss gait cycle and its stages	C2	Skill Lab	OSPE
	• Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3	]	
	Apply strategic use of AI in health care	C3	]	
	Read a research article	C3		
Thymus, Tonsils	Describe location of thymus and tonsils	C2		
	Discuss anatomical features of thymus and tonsils	C2	]	MCQ

	Describe blood supply, venous drainage and lymphatic drainage of thymus and tonsils	C2	SGD, Skill Lab	SAQ VIVA
	Enumerate functions of thymus and tonsils	C1		OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Discuss the location of spleen	C2		
	Enumerate anatomical relations of spleen	C1		
	Discuss blood supply, venous drainage and lymphatic drainage of spleen	C2	SGD, Skill Lab	MCQ SAQ
Spleen	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		VIVA
	Practice the principles of Bioethics	C3		OSPE
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Identify different structures on radiographs	C3		
Radiology, Surface Anatomy & Cross	Demonstrate the surface anatomy of various structures present in posterior compartment of leg and foot	P	SGD, Skill Lab	MCQ SAQ
Sectional Anatomy	Demonstrate the surface anatomy of spleen, thymus and tonsils	P		VIVA
	Discuss the Cross-Sectional anatomy at the level of leg & foot	C2	7	OSPE
	Correlate the clinical conditions	C3	7	
	Understand the preventive and curative health care measures	C3	7	
	Practice the principles of Bioethics	C3	]	
	Apply strategic use of AI in health care	C3		
	Read a research article	C3	7	

# **Physiology Small Group Discussion (SGDs)**

Topics	At the end of discussion students should be able to:	Learning	Teaching	Assessment
		Domains	Strategy	Tools
	1.Describe composition and general functions of blood	1.C2		MCQ
Functions &	2.Explain the role of bone marrow in hemopoiesis and erythropoiesis	2. C2		SEQ
composition of blood,	3.Draw steps of hemopoiesis	3. C3	SGD	VIVA VOCE
Hemopoiesis and Bone	4. Define committed and uncommitted cells	4. C1		MCQ (LMS based
marrow	5.Correlate basic knowledge with clinical application	5.C3		Assessment, MST based
				Assessment)
				OSPE
	1. Discuss details about iron metabolism in body including iron absorption	C2		MCQ
Hamaalahin 0-	and storage	C2		SEQ
Hemoglobin & Hemoglobinopathies,	2. Understand the structure, synthesis and functions of hemoglobin and its	C1		VIVA VOCE
Iron Metabolism	types	C3	SGD	MCQ (LMS based
	3. Enlist different types of hemoglobinopathies			Assessment, MST based
	4. Correlate basic knowledge with clinical application			Assessment)
	We only the case and wrongs with the approximent			OSPE
	1. Explain thrombocytopenia	C2		MCQ
Platelet formation &	2. Describe functions of platelets	C2		SEQ
function. hemostasis,	3. Define hemostasis	C1	SGD	VIVA VOCE
blood coagulation tests	4. Explain steps of hemostasis	C2		MCQ (LMS based
(BT, CT, PT, APTT	5. Correlate basic knowledge with clinical application	C3		Assessment, MST based
and INR)	Transfer and trans			Assessment)
				OSPE
	Explain Concept of temperature	C2		MCQ
	2. Discuss Physiological mechanism of temperature regulation	C2		SEQ
Physiological	3. Correlate basic knowledge with clinical application	C3	SGD	VIVA VOCE
mechanism of				MCQ (LMS based
temperature regulation				Assessment, MST based
				Assessment)
				OSPE
G, c	1. Elaborate Morphological features of RBCs	C2		MCQ
Stages of	2. Describe the stages of production of RBCs	C1		SEQ
Erythropoiesis Factors	3. Recall Life span of RBCs	C1	SGD	VIVA VOCE
Affecting	•	C2		

Erythropoiesis (First week)	<ol> <li>Enumerate and explain factors which affect erythropoiesis</li> <li>Enlist sites of production of erythropoietin</li> <li>Describe recombinant erythropoietin</li> <li>Explain mechanism of release and action of erythropoietin</li> </ol>	C1 C2 C2		MCQ (LMS based Assessment, MST based Assessment) OSPE
Physiology of WBC (third week)	<ol> <li>Enumerate and explain various types of leukocytes and steps of leucopoiesis</li> <li>Explain the characteristics and functions</li> <li>Conditions in which these cells are increased and decreased</li> <li>Leukemias and their effects on the body</li> </ol>	C1/C2 C2 C2 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Physiology of platelets (Fourth week)	<ol> <li>Explain thrombocytopenia</li> <li>Describe functions of platelets</li> <li>Define hemostasis</li> <li>Explain steps of hemostasis</li> </ol>	C2 C2 C1 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Blood transfusion hazards. Tissue and organ transplantations (Fifth week)	<ol> <li>Discuss Blood transfusion hazards.</li> <li>Explain Effect of blood transfusion on various organs</li> <li>Explain Tissue and organ transplantations</li> </ol>	C2 C2 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Disorders of temperature regulation (Fever, Heat stroke, Exposure of body to extreme cold) (Fifth week)	<ol> <li>Discuss Disorders of temperature regulation</li> <li>Explain Concept of Fever</li> <li>Clinical correlation Of Heat Stroke</li> </ol>	1.C2 2.C2 3.C3	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

# **Biochemistry Small Group Discussion (SGDs)**

Topic	At the End of Tutorial Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
	Explain structure and biomedical role of hemoglobin & Myoglobin	C2		
Blood	Describe oxygen dissociation curve and its significance.	C2	SGD	MCQs, SAQs
	• Types of Hb	C1		Viva
	• Describe sources, structure, Biochemical role and related diseases of iron.	C2	acp	1400 040
Iron			SGD	MCQs, SAQs Viva
				viva

### **Anatomy Self-Directed Learning (SDL)**

Topics	Learning objectives	Learning Resources
	<ul> <li>Illustrate cutaneous innervation</li> <li>Describe superficial fascia &amp; deep fascia.</li> </ul>	Clinically Oriented Anatomy     9th Edition, pg no.755
Posterior compartment of leg and flexor retinaculum	<ul> <li>Discuss superficial and deep muscle groups in posterior compartment</li> <li>Tabulate origin, insertion, nerve supply and action of all muscles of posterior compartment of leg</li> <li>Discuss ruputured calcaneal tendon, calcaneal bursitis and accessory soleus muscle</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	<ul> <li>https://www.youtube.com/watch?v=Bj4c7wGdIwc &amp;pp=ygUTY29tcGFydG1lbnRzIG9mIGxlZw%3 D%3D</li> <li>https://www.sciencedirect.com/science/article/abs/ pii/S1440244004800343</li> <li>•</li> </ul>
Neurovascular organization of posterior compartment of leg	<ul> <li>Describe origin, course relations, branches and tributaries of neurovascular bundle</li> <li>Discuss superficial veins i.e long and short saphenous veins</li> <li>Palpate the posterior tibial pulse</li> <li>Discuss clinical correlation related to venous return in leg</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	<ul> <li>Clinically Oriented Anatomy 9th Edition, pg no. 755</li> <li>https://www.youtube.com/watch?v=Bj4c7wGdIwc &amp;pp=ygUTY29tcGFydG1lbnRzIG9mIGxlZw%3 D%3D</li> <li>https://www.mdpi.com/2077-0383/11/21/6448</li> </ul>
Foot Joints	<ul> <li>Classify the joints of foot</li> <li>Discuss the articular surfaces, joint capsules, ligaments, movements and muscles producing movements</li> <li>Discuss major ligaments in detail</li> <li>Discuss tibial nerve entrapment</li> <li>Discuss club foot, claw foot and other clinical conditions</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> </ul>	<ul> <li>Clinically Oriented Anatomy         <ul> <li>9th Edition, pg no. 808</li> </ul> </li> <li><ul> <li>https://www.youtube.com/watch?v=Ex9KzkAYN-8&amp;pp=ygUKZm9vdCBqb2ludA%3D%3D</li> </ul> </li> <li>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3</li></ul>

	Describe the attachment of capsule	•	Clinically Oriented Anatomy
	• Enumerate the ligaments		9th Edition, <b>pg no. 806</b>
	• Discuss the movements possible at ankle joint and muscles producing the	em	
	• Discuss ankle sprain		https://www.youtube.com/watch?v=Ex9KzkAYN-
Ankle joint	• Discuss different types of ankle injuries		8&pp=ygUKZm9vdCBqb2ludA%3D%3D
	• Correlate the clinical aspects		
	Read relevant research article	•	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3
	• Use digital library		<u>414868/</u>
		•	Clinically Oriented Anatomy
	Identify Surface landmarks		9th Edition, <b>pg no. 768-781</b>
	<ul> <li>Describe cutaneous innervation of sole of foot</li> </ul>		,, <b>F8</b>
	<ul> <li>Describe Plantar aponeurosis its attachments</li> </ul>	•	https://www.youtube.com/watch?v=JorGDBbPzI&
Sole of foot	Discuss flexor retinaculum		pp=ygUcc29sZSBvZiBmb290IGFuYXRvbXkgbG
	• Discuss muscles in different layers of foot with origin, insertion, nerve		VjdHVyZQ%3D%3D
	supply and actions		
	Correlate the clinical aspects	•	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3
	Read relevant research article		<u>311689/</u>
	Use digital library		
	Discuss the location of spleen	•	Clinically Oriented Anatomy
	• Enumerate anatomical relations of spleen		9th Edition, <b>pg no. 487</b>
	• Discuss blood supply, venous drainage and lymphatic drainage of spleer	n	
Spleen	• Discuss clinical correlations of spleen with special reference to splenectors.		https://www.youtube.com/watch?v=3K5I6MMDA
	• Correlate the clinical aspects		8M&pp=ygUOc3BsZWVuIGFuYXRvbXk%3D
	Read relevant research article		
	• Use digital library	•	https://www.sciencedirect.com/science/article/pii/
	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		<u>S0046817782802232</u>
	• Define the gait cycle	•	Clinically Oriented Anatomy
	• Discuss the stages of gait cycle		9th Edition, <b>pg no. 701, 768-781</b>
Gait cycle	Correlate the clinical aspects		
	Read relevant research article	•	https://www.youtube.com/watch?v=1u6d1CX7o9c
	Use digital library		<u>&amp;pp=ygUXZ2FpdCBjeWNsZSBiaW9tZWNoYW</u>
			<u>5pY3M%3D</u>
		•	https://www.sciencedirect.com/topics/engineering/
			gait-cycle

### **Physiology Self-Directed Learning (SDL)**

<b>Topics Of SDL</b>	<b>Learning Objectives</b>	Learning Resources		
ON CAMPUS Platelet formation & function. hemostasis, blood coagulation tests (BT, CT, PT, APTT and INR)	<ol> <li>Explain thrombocytopenia</li> <li>Describe functions of platelets</li> <li>Define hemostasis         <ul> <li>Explain steps of hemostasis</li> </ul> </li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section 05, (Chapter 31, Page 564) (Chapter 03, Page 79)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 16, Page 558)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 24, Page 413)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 06. (Chapter 37, Page 477,487)</li> <li>https://my.clevelandclinic.org/health/symptoms/21999-hemostasis</li> <li>https://www.sciencedirect.com/topics/neuroscience/hemostasis</li> </ul>		
Concept of intravascular anticoagulants and bleeding disorders (Vit K deficiency, hemophilia and thrombocytopenia)	<ol> <li>Explain Intravascular coagulation</li> <li>Discuss Bleeding disorders</li> <li>Enlist Types of hemophilia</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Section 05, (Chapter 31, Page 566)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 24, page 427)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 37, Page 484)</li> <li><a href="https://youtu.be/unp3vGsxlIA">https://youtu.be/unp3vGsxlIA</a></li> <li><a href="https://www.hematology.org/education/patients/bleeding-disorders">https://www.hematology.org/education/patients/bleeding-disorders</a></li> </ul>		
(OFF CAMPUS): Composition of blood	<ul> <li>1.Describe composition and general functions of blood</li> <li>2.Explain the role of bone marrow in hemopoiesis and erythropoiesis</li> <li>3.Draw steps of hemopoiesis</li> <li>4. Define committed and uncommitted cells</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Section 05, Cardiovascular Physiology (Chapter 31, Page 553)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 547,548)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 03, Blood (Chapter 19, Page 347) (Chapter 20, Page 356)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Red blood cells, Anemia and Polycythemia. Section 06. (Chapter 33, Page 439)</li> <li>https://accessmedicine.mhmedical.com/content.aspx?bookid=3047&amp;sectionid=255121548</li> <li>2.https://youtu.be/cm8IK24RRvA</li> </ul>		

Function of Plasma Proteins	<ul> <li>1.Enumerate plasma proteins, their properties, sites of productions and their functions</li> <li>2.Explain effects of deficiency of plasma proteins</li> <li>3.Discuss conditions associated with decreased production and increased excretion of plasma proteins</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Section 05, Cardiovascular Physiology (Chapter 31, Page 563)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 547)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 03, Blood (Chapter 19, Page 348,353)</li> <li><a href="https://www.ncbi.nlm.nih.gov/books/NBK531504/2.https://accessmedicine.mhmedical.com/content.aspx?bookid=1366&amp;sectionid=73247095">https://accessmedicine.mhmedical.com/content.aspx?bookid=1366&amp;sectionid=73247095</a></li> </ul>
WBCs classification & formation. Neutrophils, Eosinophils & Basophils and their properties	Enumerate and explain various types of leukocytes and steps of leucopoiesis Explain the characteristics and functions Conditions in which these cells are increased and decreased Leukemias and their effects on the body	<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Resistance of the body to Infection. Section 06. (Chapter 34, Page 449,456,457)</li> <li>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9777002/2.https://youtu.be/TelOcCkZX7c</li> </ul>
Monocytes - macrophage system & lymphocytes	Explain the characteristics and functions of monocytes.  • Explain monocytemacrophage system; importance	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Section 01, Immunity, Infection and Inflammation (Chapter 03, Page 67)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 03, Blood (Chapter 21, Page 371) (Chapter 22, Page 387)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 450-452)</li> <li><a href="https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system">https://www.sciencedirect.com/topics/pharmacology-toxicology-and-pharmaceutical-science/mononuclear-phagocyte-system</a> </li> <li>2. <a href="https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4">https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0392-4</a></li> </ul>
Process of inflammation and Lines of defense during inflammation	<ul> <li>Describe the role of neutrophils and monocytes in inflammation</li> <li>Elaborate Lines of defense</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section 01, Immunity, Infection and Inflammation (Chapter 03, Page 81)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. Section 03, Blood) (Chapter 22, Page 384)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 06. (Chapter 34, Page 454)</li> </ul>

Red cell fragility, ESR & Red cell indices, Anemia & polycythemia	<ol> <li>Define RBC fragility; importance; conditions in which fragility is changed.</li> <li>Discuss various blood indices, give their formulae, co-relate with different types of anemias.</li> <li>Enumerate various types of anemias and polycythemias.</li> <li>Discuss details about various types of anemias and polycythemia and their</li> </ol>	<ol> <li>https://youtu.be/WFm9j1rNkQs</li> <li>.https://en.wikipedia.org/wiki/Inflammation</li> <li>.https://www.verywellhealth.com/signs-of-inflammation-4580526</li> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Section 05, (Chapter 31, Page 555)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 553)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 23, Page 407,409)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 34, Page 446,447)</li> <li>https://www.sciencedirect.com/topics/medicine-and-dentistry/red-blood-cell-indices 2.https://youtu.be/QUHqYVK-Nhg 3. https://youtu.be/mOrRJBqm744</li> </ol>
Blood coagulation	effect on circulatory system.  • Explain hemostasis, mechanism of blood coagulation, fibrinolysis and anticoagulants	<ol> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 16, Page 559)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 24, Page 417)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 06. (Chapter 37, Page 479)</li> <li><a href="https://youtu.be/gExUCrpAKyQ">https://youtu.be/gExUCrpAKyQ</a></li> <li><a href="https://medlineplus.gov/lab-tests/coagulation-factor-tests/">https://medlineplus.gov/lab-tests/coagulation-factor-tests/</a></li> </ol>
ABO & Rh Blood grouping system	Blood group and its types     Rh Blood Grouping System	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section 05, (Chapter 31, Page 558) (Chapter 36, Page 473)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 25, Page 432)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 06. (Chapter 36, Page 471)</li> <li>https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/abo-blood-group-system</li> <li>https://youtu.be/wfqnNuYIY78</li> </ul>

## **Biochemistry Self-Directed Learning (SDL)**

<b>Topics Of SDL</b>	Learning Objectives	Learning resources		
Structure of hemoglobin and myoglobin	<ul> <li>Describe Structure of hemoglobin</li> <li>Describe structure of myoglobin.</li> <li>Discuss Biochemical roles of hemoglobin and myoglobin.</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 03, page 25-28)</li> <li><a href="https://doi.org/10.1016/j.bcmd.2017.10.006">https://doi.org/10.1016/j.bcmd.2017.10.006</a></li> <li><a href="https://www.youtube.com/watch?v=Qv-KExGKAYw">https://www.youtube.com/watch?v=Qv-KExGKAYw</a></li> <li>Use digital library</li> <li><a href="https://chemed.chem.purdue.edu/genchem/topicreview/bp/1biochem/blood3.html">https://chemed.chem.purdue.edu/genchem/topicreview/bp/1biochem/blood3.html</a></li> </ul>		
Types of Hemoglobin	<ul> <li>Enlist various types of Hemoglobin.</li> <li>Describe Importance of heme and globin components</li> <li>Interpret importance of HbA1c in diagnosis of Diabetes</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 03, page 33-34)</li> <li>https://pubmed.ncbi.nlm.nih.gov/34200315/</li> <li>https://www.youtube.com/@DrAishwaryaKelkar</li> <li>Use digital library</li> <li>https://www.ucsfhealth.org/medical-tests/hemoglobin-electrophoresis#:~:text=Many%20different%20types%20of%20hemoglobin,have%20small%20amounts%20of%20HbF</li> </ul>		
Oxygen dissociation curve.	<ul> <li>Discuss Importance of oxygen dissociation curve.</li> <li>Enlist various factors affecting the curve.</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 03, page 28-32)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/2650756/">https://pubmed.ncbi.nlm.nih.gov/2650756/</a></li> <li><a href="https://youtu.be/BYGPkRFvzOc">https://youtu.be/BYGPkRFvzOc</a></li> <li>Use digital library</li> <li><a href="https://www.osmosis.org/learn/Oxygen-hemoglobin_dissociation_curve">https://www.osmosis.org/learn/Oxygen-hemoglobin_dissociation_curve</a></li> </ul>		
Hemoglobinopathies	<ul> <li>Discuss hemoglobinopathies.</li> <li>Enlist Types of thalassemia.</li> <li>Discuss Familial counseling.</li> <li>Elaborate Preventive measures.</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 03, page 35-39)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/30193516/">https://pubmed.ncbi.nlm.nih.gov/30193516/</a></li> <li><a href="https://youtu.be/34u1sOLrgV0">https://youtu.be/34u1sOLrgV0</a></li> <li>Use digital library</li> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3163784/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3163784/</a></li> </ul>		
Heme synthesis	Describe enzymatic regulation of heme synthesis	• Lippincott Illustrated reviews of biochemistry 8 <sup>th</sup> edition (Chapter 21, page 277-279)		

Porphyria	Discuss various types of porphyria	<ul> <li>https://www.sciencedirect.com/science/article/pii/S0891584999002 233</li> <li>Use digital library</li> <li>https://www.youtube.com/watch?v=f-0n_eOK4JE</li> <li>https://pubmed.ncbi.nlm.nih.gov/29126700/</li> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 21, page 279-281)</li> <li>https://pubmed.ncbi.nlm.nih.gov/20226990/</li> <li>https://www.mayoclinic.org/diseases-</li> </ul>
Тогрпупа		<ul> <li>conditions/porphyria/symptoms-causes/syc- 20356066#:~:text=Porphyria%20(por%2DFEAR%2De,the%20bod y's%20organs%20and%20tissues.</li> <li>https://www.aacc.org/science-and-research/clinical-chemistry- trainee-council/trainee-council-in-english/pearls-of-laboratory- medicine/2012/porphyrias</li> </ul>
Breakdown of hemoglobin	<ul> <li>Elaborate steps in the breakdown of hemoglobin.</li> <li>Describe Steps in synthesis of Bilirubin</li> <li>Recall Normal level of S. Bilirubin.</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 21, page 282-283)</li> <li><a href="https://www.sciencedirect.com/science/article/pii/S0891584999002233">https://www.sciencedirect.com/science/article/pii/S0891584999002233</a></li> <li>Use digital library</li> <li><a href="https://www.youtube.com/watch?v=f-0n_eOK4JE">https://www.youtube.com/watch?v=f-0n_eOK4JE</a></li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/29126700/">https://pubmed.ncbi.nlm.nih.gov/29126700/</a></li> </ul>
Jaundice	<ul> <li>Define jaundice.</li> <li>Recall normal level of Bilirubin.</li> <li>Enlist types of Jaundice.</li> <li>Describe Biochemical tests to distinguish various types of jaundice.</li> <li>Describe Physiological Jaundice</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 21, page 284-285)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/14765767/">https://pubmed.ncbi.nlm.nih.gov/14765767/</a></li> <li><a href="https://www.youtube.com/watch?v=gIACp5js4MU">https://www.youtube.com/watch?v=gIACp5js4MU</a></li> <li><a href="https://my.clevelandclinic.org/health/diseases/15367-adult-jaundice">https://my.clevelandclinic.org/health/diseases/15367-adult-jaundice</a></li> </ul>

Plasma proteins	<ul> <li>Describe plasma proteins.</li> <li>Discuss Biochemical role of various plasma proteins.</li> <li>Recall normal levels of plasma proteins</li> <li>Illustrate Role of A/G ratio.</li> </ul>	<ul> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 588-589)</li> <li>http://ib.bioninja.com.au/options/option-d-human-physiology/d3-functions-of-the-liver/plasma-proteins.html</li> <li>https://www.nottingham.ac.uk/nmp/sonet/rlos/bioproc/plasma_proteins/page_three.html</li> <li>https://pubmed.ncbi.nlm.nih.gov/21544836/</li> <li>Use digital library</li> </ul>
Acute phase proteins & Albumin	<ul> <li>Describe Role of albumin.</li> <li>Discuss Role of C- reactive protein.</li> </ul>	<ul> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 590-592)</li> <li><a href="https://www.youtube.com/watch?v=xMSEl1ad0z8">https://www.youtube.com/watch?v=xMSEl1ad0z8</a></li> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3053509/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3053509/</a></li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/9971870/">https://pubmed.ncbi.nlm.nih.gov/9971870/</a></li> <li>Use digital library</li> </ul>
Haptoglobin and transferrin	<ul> <li>Describe Structure of Haptoglobin and transferrin.</li> <li>Discuss biochemical Role of Haptoglobin and transferrin.</li> </ul>	<ul> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 592)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/23016887/">https://pubmed.ncbi.nlm.nih.gov/23016887/</a></li> <li><a href="https://www.youtube.com/watch?v=QR_hcSow4OI">https://www.youtube.com/watch?v=QR_hcSow4OI</a></li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/7027909/">https://pubmed.ncbi.nlm.nih.gov/7027909/</a></li> <li>Use digital library</li> </ul>
Ferritin and hemosiderin	<ul> <li>Describe biochemical role of ferritin and hemosiderin.</li> <li>Describe Hemosiderosis.</li> </ul>	<ul> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 592-594)</li> <li><a href="http://www.vivo.colostate.edu/hbooks/pathphys/topics/ferritin.html">http://www.vivo.colostate.edu/hbooks/pathphys/topics/ferritin.html</a> </li> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4831249/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4831249/</a> </li> <li><a href="https://www.forthwithlife.co.uk/blog/whats-the-difference-between-ferritin-and-iron/">https://www.forthwithlife.co.uk/blog/whats-the-difference-between-ferritin-and-iron/</a> </li> <li>Use digital library</li> </ul>

Ceruloplasmin.	<ul> <li>Describe biochemical role of ceruloplasmin.</li> <li>Discuss Wilson's disease.</li> </ul>	<ul> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 595-597)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/12055353/">https://pubmed.ncbi.nlm.nih.gov/12055353/</a></li> <li><a href="https://www.youtube.com/watch?v=KCh-7Ghj0jY">https://www.youtube.com/watch?v=KCh-7Ghj0jY</a></li> <li><a href="https://www.mountsinai.org/health-library/tests/ceruloplasmin-blood-test">https://www.mountsinai.org/health-library/tests/ceruloplasmin-blood-test</a></li> <li>Use digital library</li> </ul>
Antiproteases and amyloidosis	Describe biochemical role of antiproteases and amyloidosis.	<ul> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 597-598)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/31986086/">https://pubmed.ncbi.nlm.nih.gov/31986086/</a></li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/1719439/">https://pubmed.ncbi.nlm.nih.gov/1719439/</a></li> <li><a href="https://www.youtube.com/watch?v=CQ5q3phGdtQ">https://www.youtube.com/watch?v=CQ5q3phGdtQ</a></li> <li>Use digital library</li> </ul>
Immunoglobulins	<ul> <li>Describe Structure of Immunoglobulin.</li> <li>Discuss biochemical role of various Immunoglobulin.</li> <li>Elaborate Class switching.</li> </ul>	<ul> <li>Harpers Illustrated biochemistry 30<sup>th</sup> edition (Chapter 49, page 599-603)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/4188929/">https://pubmed.ncbi.nlm.nih.gov/4188929/</a></li> <li><a href="https://www.youtube.com/watch?v=29mlSMaD-cY">https://www.youtube.com/watch?v=29mlSMaD-cY</a></li> <li><a href="https://medlineplus.gov/lab-tests/immunoglobulins-blood-test/#:~:text=Immunoglobulins%20are%20also%20called%20antibodies,to%20destroy%20only%20those%20germs">https://medlineplus.gov/lab-tests/immunoglobulins-blood-test/#:~:text=Immunoglobulins%20are%20also%20called%20antibodies,to%20destroy%20only%20those%20germs</a>.</li> <li>Use digital library</li> </ul>
AIDs	<ul> <li>Define AIDs</li> <li>Describe Immunological defects in AIDs.</li> <li>Discuss various preventive measures.</li> </ul>	<ul> <li>Mushtaq volume II, 7<sup>th</sup> edition (chapter 11 page – 333-338)</li> <li>https://pubmed.ncbi.nlm.nih.gov/3277764/</li> <li>https://www.who.int/news-room/fact-sheets/detail/hiv-aids#:~:text=Acquired%20immunodeficiency%20syndrome%20(A IDS)%20is,tuberculosis%2C%20infections%20and%20some%20cancers.</li> <li>https://www.cdc.gov/hiv/basics/whatishiv.html</li> <li>Use digital library</li> </ul>

Folic acid.	<ul> <li>Recall Sources of folic acid.</li> <li>Discuss deficiency effects of folic acid</li> <li>Describe biochemical role of folic acid.</li> <li>Recall Recommended Dietary allowance.</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 28, page 378-379)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/29777755/">https://pubmed.ncbi.nlm.nih.gov/29777755/</a></li> <li><a href="https://www.cdc.gov/ncbddd/folicacid/about.html">https://www.cdc.gov/ncbddd/folicacid/about.html</a></li> <li><a href="https://www.cdc.gov/ncbdd/folicacid/about.html">https://www.cdc.gov/ncbdd/folicacid/about.html</a></li> <li><a href="https://www.cdc.gov/ncbdd/folicacid/about.html">https://www.cdc.gov/ncbdd/folicacid/about.html</a></li> <li><a href="https://www.cdc.gov/ncbdd/folicacid/about.html">https://www.cdc.gov/ncbdd/folicacid/about.html</a></li></ul>
Vitamin B12	<ul> <li>Recall Sources of Vitamin B12</li> <li>Describe biochemical role of vitamin B12</li> <li>Discuss Deficiency effects of B12</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 28, page 379-381)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/25824066/">https://pubmed.ncbi.nlm.nih.gov/25824066/</a></li> <li><a href="https://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional/">https://ods.od.nih.gov/factsheets/VitaminB12-HealthProfessional/</a></li> <li><a href="https://www.youtube.com/watch?v=j-2xHmcKkcy">https://www.youtube.com/watch?v=j-2xHmcKkcy</a></li> <li>Use digital library</li> </ul>
Iron	<ul> <li>Recall Sources of iron.</li> <li>Describe Transport and absorption of iron.</li> <li>Discuss hyper and hypo functions of iron.</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 29, page 403-404)</li> <li><a href="https://pubmed.ncbi.nlm.nih.gov/34373750/">https://pubmed.ncbi.nlm.nih.gov/34373750/</a></li> <li><a href="https://www.youtube.com/watch?v=vSkb0kDacjs">https://www.youtube.com/watch?v=vSkb0kDacjs</a></li> <li><a href="https://ods.od.nih.gov/factsheets/Iron-HealthProfessional/">https://ods.od.nih.gov/factsheets/Iron-HealthProfessional/</a></li> <li>Use digital library</li> </ul>

# **Histology Practicals Skill Laboratory (SKL)**

Topic	At the End of The Session Students Should Be Able To:	Learning Domains	Teaching Strategy	Assessment Tools
	Identify lymph node under microscope	P	Strategy	10015
Lymph node	• Focus the slide	P		
	Draw the histological structure of lymph node	C2	Skill Lab	OSPE
	• Enlist two identification points of lymph node	C1		
	• Identify the slide of thymus under light microscope	P		
	• Focus the slide	P		
Thymus	Draw the histological structure of thymus	C2	Skill Lab	OSPE
	• Enlist two identifications points of thymus	C1		
	• Identify the slide of spleen under light microscope	P		
Spleen	• Focus the slide	P	Skill Lab	OSPE
	• Draw histological structure of spleen,	C2		
	• Enlist two identification points of spleen	C1		
	• Identify the slide of tonsils under light microscope	P		
Tonsils	• Focus the slide	P	Skill Lab	OSPE
	• Draw histological structure of tonsils	C2		
	Write two identification points of tonsils	C1		

## **Physiology Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives	Learning Domains	Learning Strategy	Assessment Tools
Determination of Rh blood group	<ul> <li>Principle</li> <li>Procedure</li> <li>Methods</li> <li>Types of blood groups</li> <li>Clinical Correlations of blood transfusion</li> </ul>	C1/C3 A3 P3	Practical/ skill lab	Viva Voce OSPE Video Assisted Assessment
Determination of Clotting time (CT)	<ul><li>Procedure</li><li>Clinical importance</li><li>Recall Normal values</li></ul>	C1/C3 A3 P3	Practical/ skill lab	Viva Voce OSPE Video Assisted Assessment
Determination of Bleeding time (BT)	<ul><li>Procedure</li><li>Clinical importance</li><li>Recall Normal values</li></ul>	C1/C3 A3 P3	Practical/ skill lab	Viva Voce OSPE Video Assisted Assessment
Recording of Body Temperature	<ul><li>Principle</li><li>Procedure</li><li>Methods</li><li>Clinical Correlations</li></ul>	C1/C3 A3 P3	Practical/ skill lab	Viva Voce OSPE Video Assisted Assessment
Reference: Saqib Practical Copy First Year				

# Biochemistry Practical Skill Laboratory (SKL)

Topic	At the End of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Draw of Blood Technique	How to draw blood	P	Skill Lab	OSPE
Quantitative Estimation of Serum Total Proteins	<ul> <li>Perform estimation of serum Protein</li> <li>Describe Principal, method, normal blood level and clinical significance of S. Proteins</li> </ul>	P	Skill Lab	OSPE
Hemin crystals Technique to draw blood	• Describe Preparation, shape and clinical significance of hemin crystals Illustrate Method and precautions to draw blood.	P	Skill Lab	OSPE
Estimation of S. Bilirubin	<ul> <li>Perform estimation of serum bilirubin</li> <li>Describe Principal, method, normal blood level and clinical significance of S. Bilirubin</li> </ul>	P	Skill Lab	OSPE

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

# **Case Based Learning Objectives (CBL)**

Subjects	Topics At the end of the session the student should be able to		Learning Domains
	<ul> <li>Ankle sprain</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
Anatomy	<ul> <li>Flat foot</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
Physiology	<ul> <li>Anemia</li> </ul>	Apply basic knowledge of subject to study clinical case	C3
Biochemistry	• Thalassemia	Apply basic knowledge of subject to study clinical case.	C3
Brochemistry	Jaundice	Apply basic knowledge of subject to study clinical case.	C3

# **Vertical Integration LGIS**

### **Pathology**

Topic	At the End of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
_	Define inflammation	C1		
Mediators of	Classify inflammation	C2	LGIS	MCQ
Inflammation	Classify mediators of inflammation	C2		
	Cell derived Plasma derived			
	Describe general features of mediators of	C1		
	inflammation			

### Medicine

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
	Discuss Jaundice.	C2		
	• Discuss various Types and Subtypes of Jaundice.	C2		
Jaundice	• Discuss the signs and symptoms of a patient with Jaundice due to various	C2	LGIS	MCQs
Jaundice	Causes.		LOIS	WICQS
	• Discuss the workup for diagnosis of different type of Jaundice	C2		
	• Discuss Treatment of Various Causes of Jaundice.	C2		
	Discuss the diagnostic workup and treatment.	C2		
	• Define Heat Stroke.	C1		
	• Discuss the clinical Presentation of Heat Stroke.	C2		
	• Discuss the diagnostic workup and management.	C2		

## **Obstetrics & Gynecology**

Topic	At the End of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
	Know the basic pathophysiology of Rh sensitization	C2		
Rh incompatibility and its significance	• Describe the fetal effects of Rh isoimmunization	C2	LGIS	MCQs
	Understand signs of fetal anemia	C2		
	• Describe role of Anti-D antibodies in prevention of Rh isoimmunization	C2		

### **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

#### Content

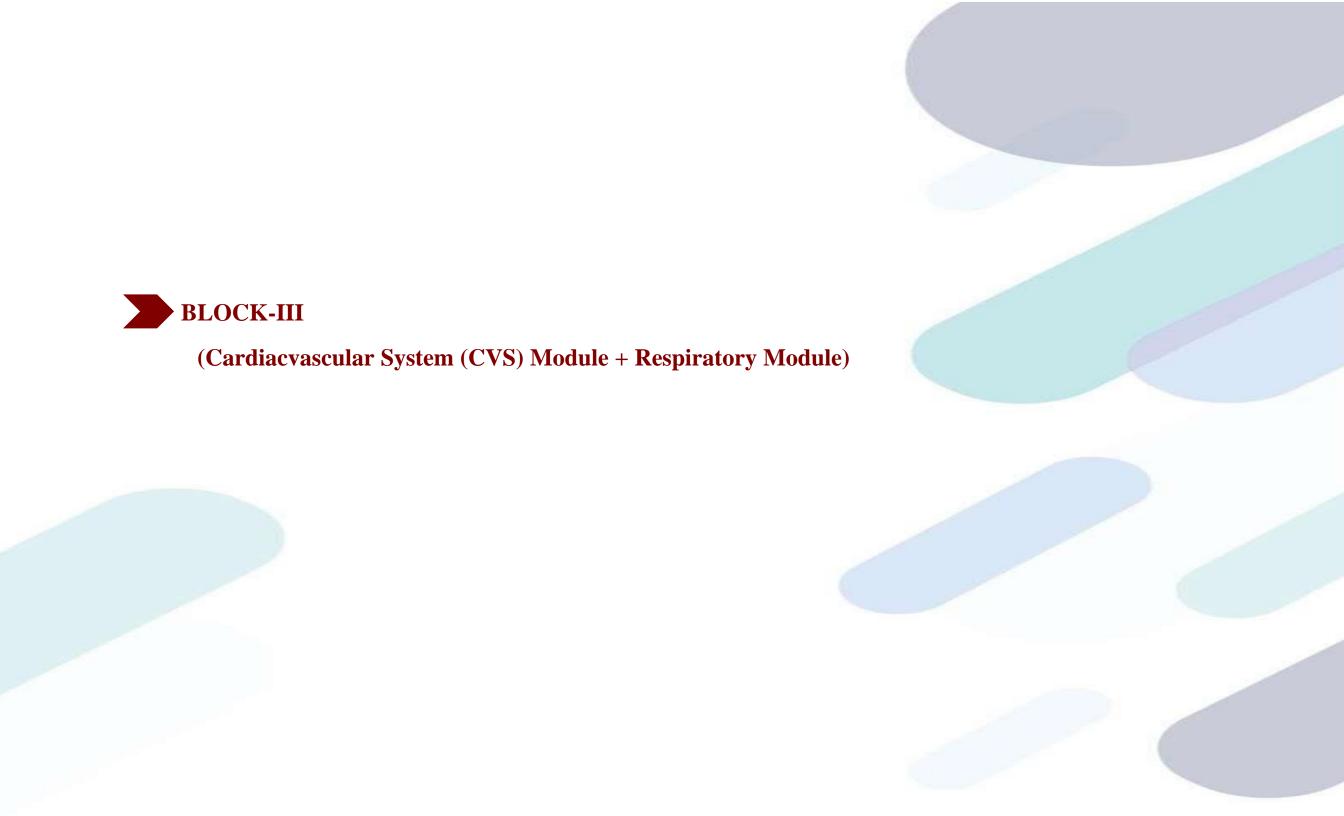
- Longitudinal Themes
  - o The Holy Quran Translation
  - o Family Medicine
  - o Biomedical Ethics & Professionalism
  - o Early Clinical Exposure (ECE)

### Family Medicine

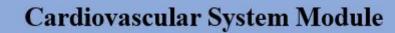
Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
		Domain	Strategy	1001
	• Define Anemia.	C1		
	• Discuss various Types and Subtypes of Anemia.	C2	LGIS	MCQs
Anemia	• Discuss the signs and symptoms of a patient with Anemia.	C2		
	• Discuss the workup for diagnosis of type of anemia.	C2		
	• Discuss Treatment of Various types of anemia.	C2		

### **Biomedical Ethics**

Topics	At the end of session students should be able to:	Learning	Teaching	<b>Assessment Tools</b>
		<b>Domains</b>	Strategy	
	At the end of the session students should be able to;		Short video demonstration on	Assignment based assessment
	Understand the importance of taking permission before performing procedures (drawing blood, administering)	A1	violation of Ethical principle	involving real life case scenarios
Laboratory Ethics	injections etc.) during laboratory sessions. A1		of autonomy from suit CBEC Video	under aggregate  Marks
	Show Respects other health professional team members and complete assigned task in professional manner. A1	A1	resources	(Internal Assessment)  • Assignment to be uploaded on LMS
	• Employ collaborative negotiation to resolve conflict, anger, confusion and misunderstanding. A2	A2		aproduced on Eivis

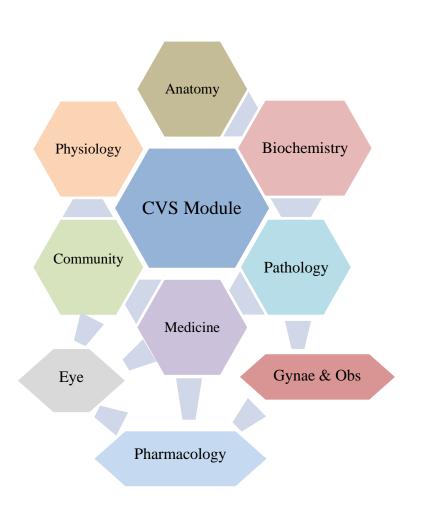




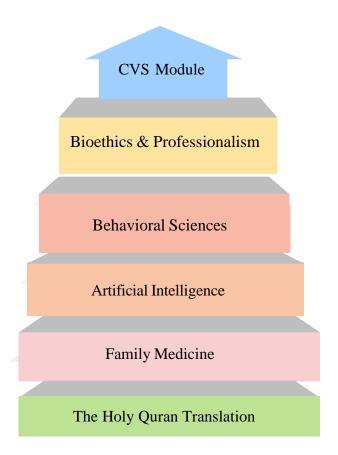




### **Integration of Disciplines in CVS Module**



### **Spiral / General Education Cluster Courses**



# **Discipline Wise Details of Modular Contents**

Block	Subjects	General		Embryology		Histology		<b>Gross Anatomy</b>		
		Anatomy								
	• Anatomy	Heart &     Vessels	•	Cardiovascular System	•	Heart & Vessels	•	Mediastinum, Heart, Great Vessels		
	Biochemistry     Carbohydrate chemistry, Lipid chemistry									
	• Physiology	<ul> <li>The Heart as a Pump and Function of the Heart Valves&amp; regulation of heart pumping, cardiac cycle</li> <li>Rhythmical Excitation of the Hear &amp;Specialized excitatory &amp; conductive system of the heart &amp; its control (revisit)</li> <li>Electrocardiogram, its interpretation &amp; its abnormalities</li> <li>Medical Physics of Pressure, Flow, and Resistance, Vascular Distensibility and Functions of the Arterial and Venous Systems</li> <li>Microcirculation and the Lymphatic System, Local and Humoral Control of Blood Flow by the Tissues</li> <li>Nervous Regulation of the Circulation, and Rapid &amp; Long-Term Control of Arterial Pressure, hypertension</li> <li>Cardiac Output, Venous Return, and Their Regulation</li> <li>Muscle Blood Flow and Cardiac Output During Exercise; the Coronary &amp; regional circulation</li> <li>Cardiac Failure, Circulatory Shock</li> </ul>								
		• Heart Valves a	ind .	Heart Sounds; Dynamics of	V	alvular and Congenit	al F	leart Defects		
-	The Holy Quran Translation	<ul> <li>Spiral Courses</li> <li>Mumamalat-I</li> <li>Muashrat-II</li> </ul>								
II			<ul> <li>Ekhlaqiaat-I</li> <li>Mumamalat -II</li> </ul>							
	<ul> <li>Behavioral Sciences, Bioethics &amp; Professionalism</li> </ul>	<ul><li>Breaking the b</li><li>Stress and its r</li></ul>	nan	agement						
	<ul> <li>Radiology, Artificial Intelligence &amp; Innovation</li> </ul>	<ul><li>Chest radiogra</li><li>Radiology with</li></ul>	ph v h pe	with perspective of cardiovarspective of Artificial Intelle	asc lig	cular system ence & Innovation				
	Family Medicine	Approach to a	pati	ient with chest pain						
	•	•								
j [	•	•								
[	•	•								
j [	•	•								
[				Vertical component	ts					
[	Community Medicine	Risk factors of coronary vascular disease								
j [	<ul> <li>Pathology</li> </ul>	• Edema								
i [	• Eye	Hypertensive i	etin	opathy						

Pharmacology	Clinical Pharmacology of Anti hypertensive drugs					
Medicine	ECG Changes (MI, Electrical Imbalance, Myocardial hypertrophy)					
	Overview of acute coronary syndrome & management of heart failure & management of shock					
	Hypertension					
• Gynae & Obs	Cardiovascular changes in pregnancy					
,	Hypertensive disorders in pregnancy (gestational hypertension, pre-eclampsia)					
	Early Clinical Exposure (ECE)					
<ul> <li>Cardiology</li> </ul>	See cases of Heart Failure and Dyspnea Raised JVP/Oedema					
	Clinical Examination of Precordium					
	Normal Heart Sounds					
	Additional heart sounds See Cases of Coronary Heart Disease					
<ul> <li>Radiology</li> </ul>	• X-Ray chest					
	Cardiomegaly					
	Radiological signs of heart failure					
<ul> <li>Pediatrics</li> </ul>	See cases of congenital heart diseases					
	Pediatric case of Heart Failure					
	Clinical Themes					
Hypertension						
Heart Failure						

#### **CVS Module Team**

Module Name : CVS Module
Duration of module : 05 Weeks

Coordinator:Dr. Aneela YasmeenCo-coordinator:Dr. Sheena TariqReviewed by:Module Committee

Focal Person Community Medicine Dr. Afifa Kulsoom

Dr. Fahad Anwar

Dr. Sadia Khan

Focal Person Quran Translation

14. Focal Person Family Medicine

Lectures

	Module Com	mittee	Module Task Force Team				
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Aneela (Senior Demonstrator of Physiology)		
2.	Chairperson Anatomy & Dean	Prof. Dr. Ayesha Yousaf	2.	DME Focal Person	Dr. Farzana Fatima		
	Basic Sciences						
3.	Director DME	Prof. Dr. Ifra Saeed	3.	Co-coordinator	Dr. Kashif (Senior Demonstrator of Anatomy)		
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Romessa Naeem (Demonstrator Biochemistry)		
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Sheena Tariq (Senior Demonstrator Physiology)		
6.	Focal Person Anatomy First Year MBBS	Asso. Prof. Dr. Mohtashim Hina					
7.	Focal Person Physiology	Dr. Sidra Hamid		DM	IE Implementation Team		
			1.	Director DME	Prof. Dr. Ifra Saeed		
8.	Focal Person Biochemistry	Dr. Aneela Jamil	2.	Assistant Director DME	Dr. Farzana Fatima		
9.	Focal Person Pharmacology	Dr. Zunera Hakim	3.	Implementation Incharge 1st & 2 <sup>nd</sup>	Prof. Dr. Ifra Saeed		
				Year MBBS	Dr. Farzana Fatima		
					Dr. Saira Aijaz		
10.	Focal Person Pathology	Dr. Asiya Niazi	4.	Editor	Muhammad Arslan Aslam		
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir					

#### **Module V - CVS Module**

**Rationale**: The main role of the cardiovascular system in the body is to transport oxygen to all tissues in the body and for removing, from these same tissues, metabolic waste products. The system itself consists of the blood, the medium for exchanging oxygen, nutrients and waste products throughout the body, the blood vessels, the pipes through which the blood flows and the heart, the pump which forces blood to flow through the blood vessels.

Cardiovascular health is important in maintaining overall health and wellness. This module will teach how heart and cardiovascular system work when healthy, and what happens when diseased. We will explore through lectures, SGDs and skill lab normal anatomy, physiology, biochemistry of CVS. This module will briefly discuss the common CVS diseases their prevention, therapeutic drug treatment, behavioral aspects, radiological findings.

#### **Module Outcomes**

At the end of this module the student should be able to:

#### **Knowledge:**

- 1. Explain the structural & developmental organization of CVS.
- 2. Explain different waves, segment and intervals of ECG and apply it to the interpretation of ECG.
- 3. Use technology based medical education including.

**Artificial Intelligence** 

4. Appreciate concepts & importance of Family Medicine
Bionedical Ethics
Research

#### **Skill:**

- 1. Understand the physiology of conductive system of heart, cardiac cycle.
- 2. Must understand the pathophysiology of edema, infarction, shock and thrombosis.

#### **Attitude:**

• Demonstrate Professional Attitude, Team-Building Spirit and Good Communication Specially in Small Group Discussions.

#### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



Syllabus of Cardicavascular System (CVS) Module

# Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

## **Anatomy Large Group Interactive Session (LGIS)**

Topic	At the End of The Session Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
	Describe general organization of cardiovascular system	C2		
	Describe different types of circulations	C2		
	Discuss general structural patterns of arteries and veins	C2		
	Classify capillaries	C1	T GIG	MCQ
General Anatomy of CVS (General	• Explain bio - functional importance and location of continuous, fenestrated and sinusoidalcapillaries	C2	LGIS	SAQ VIVA
Organization	Discuss related clinicals	C3		
S	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	How to read relevant research article	C3		
	• Classify arteries on the basis of function and size	C1		MCQ SAQ VIVA
	• Classify veins on the basis of function and size	C1		
	Describe differences between arteries and veins	C2		
General Anatomy	• Define anastomosis and discuss different types of arterial and venous anastomosis	C2	LGIS	
of CVS (Classification of	• Differentiate between anatomic end arteries and functional end arteries giving example	C2		
vessels)	Discuss related clincals	C3		
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	How to read relevant research article	C3		
	Histology		<b>r</b>	
	Describe general histological structure of arteries and veins	C2		

	• Tabulate histological differences between arterioles, medium sized arteries, and largearteries	C2		
Histology of CVS	Discuss related clinicals	C3	1	MCQ
(Arteries and	To understand the Biophysiological aspects	C3	LGIS	SAQ
Veins)	Able to focus on provision of curative and preventive health care measures	C3	7	VIVA
	Practice the principles of Bioethics	C3	7	
	Apply strategic use of AI in health care	C3	7	
	How to read relevant research article	C3	7	
	Differentiate between continuous, fenestrated and sinusoidal capillaries	C2		
	Enlist bio functions of endothelium	C2	7	
Histology of CVS	Discuss related clinicals	C2	7	MCQ
(Capillaries)	To understand the Biophysiological aspects	C3	LGIS	SAQ
	Able to focus on provision of curative and preventive health care measures	C3	7	VIVA
	Practice the principles of Bioethics	C3	1	
	Apply strategic use of AI in health care	C3	1	
	How to Read How to read relevant research article	C3	1	
	Describe histological details of endocardium, myocardium and epicardium	C3		
Histology of CVS	Tabulate differences between blood capillaries and lymphatic capillaries	C2		MCQ
(Tunics of Heart &	Discuss biophysiological aspects of Heart & Lymphatic System	C2	LGIS	SAQ
Lymphatic System)	To understand the Biophysiological aspects	C3		VIVA
	Able to focus on provision of curative and preventive health care measures	C3	7	
	Practice the principles of Bioethics	C3	7	
	Apply strategic use of AI in health care	C3	7	
	How to Read How to read relevant research article	C3		
	Embryological Development			
	Recall the process of vasculogenesis	C2		
	Describe venous drainage of embryo	C2	_	MCQ
Development of CVS (Development of Veins)	• Enlist derivatives of vitelline veins	C1	LGIS	SAQ
	Discuss role cardinal veins	C2		VIVA
	Describe Development of inferior vena cava	C2		
v ems)	Discuss related Congenital abnormalities	C3	_	
	To understand the Biophysiological aspects	C3	_	
	• Able to focus on provision of curative and preventive health care measures	C3		

	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	How to read relevant research article	C3		
	Describe development and transformation of aortic arches	C2		
	• Enlist derivatives of 1-6th aortic arches	C1		MCQ
Development of	Discuss formation of intersegmental arteries	C2	LGIS	SAQ
CVS	Describe sources and formation of coronary arteries	C2		VIVA
(Aortic Arches and	Discuss development of aorta Related Congenital abnormalities	C3		
derivatives)	To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	How to read relevant research article	C3		
	Discuss establishment of cardiogenin field	C2		
	Describe formation and position of heart tube in developing embryo	C2		
	Discuss formation of cardiac loop	C2		
D 1	Describe development of sinus venosus	C2		1400
Development of	• Explain importance of septum spurium	C2	LCIC	MCQ
CVS (Formation,	Describe development of cardiac septa	C2	LGIS	SAQ VIVA
Position and	• Discuss different methods of septum formation	C2		VIVA
Partitioning of	• Explain septum formation in right atrium	C2		
heart tube)	Describe development and differentiation of atria	C2		
,	Discuss related congenital abnormalities	C3		
	• To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	How to read relevant research article	C3		
	Discuss establishment of cardiogenin field	C2		
Development of	Discuss formation of septum in atrioventricular canal	C2		
CVS	Describe formation of atrioventricular valves	C2		
	Explain septum formation in truncusarteriosis&conuscordis	C2		

(Formation and partitioning of	Describe septum formation in ventricles Discuss formation of semilunar valves	C2		MCQ
Ventricles)	Discuss development of conducting system of heart	C2	LGIS	SAQ
	Discuss related Congenital abnormalities	C3		VIVA
	To understand the Biophysiological aspects	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	How to read relevant research article	C3		
	Describe fetal circulation in detail	C2		
Development of	• Discuss role of foramen ovale, ductus arteriosis and ductus venosis in fetal circulation andtheir fate	C2		
CVS	Differentiate between fetal and postnatal circulation	C2		
(Fetal circulation)	Discuss related Congenital abnormalities	C3	I CIG	MCQ
	To understand the Biophysiological aspects	C3	LGIS	SAQ
	Able to focus on provision of curative and preventive health care measures	C3		VIVA
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		

# **Physiology Large Group Interactive Session (LGIS)**

Topics	Learning Objectives	References		Learning Resources	Learning Domains	Learning Strategy	AssessmentTools
Introduction to CVS	1. Describe scheme of circulation through the heart and body	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Cardiovascular Physiology (Chapter 14, Page 469)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4, Page 117)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 02, (Chapter 05, Page 101)</li> </ul>	1. 2.	https://youtu.be/28CYhgjrBLA https://training.seer.cancer.gov/ anatomy/cardiovascular/#:~:tex t=The%20cardiovascular%20s ystem%20is%20sometimes,art eries%2C%20veins%2C%20an d%20capillaries.	1.C1	LGIS	MCQSEQ VIVA VOCEMCQ (LMS based Aseessment, MSTbased Assessment) OSPE
Classification of blood vessels & Biophysical considerations	1.Enumerate Classification of blood vessels. 2.Explain structure and functions of types of blood vessels	<ul> <li>Ganong's Review of Medical         Physiology.25TH Edition.Section 05,             Cardiovascular Physiology (Chapter 31,             Page 567,571)     </li> <li>Human Physiology by Dee Unglaub             Silver thorn. 8TH Edition. (Chapter             15, Page 513)</li> <li>Physiology by Linda S. Costanzo             6th Edition.Cardiovascular             Physiology (Chapter 4, Page 119)</li> <li>Physiological Basis of Medical             Practice by Best &amp; Taylor's.13th             Edition.Section         04 (Chapter 15, Page 183)     </li> </ul>	1. 2.	https://youtu.be/ar2_UPiGzmU https://training.seer.cancer.gov / anatomy/cardiovascular/blood/ classification.html	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Heart Sounds	Describe four heart sound and differences between 1st and 2nd heart sounds	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05, Cardiovascular Physiology (Chapter 30, Page 542)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Section 04. (Chapter 23, Page 283)</li> </ul>	1. https://youtu.be/dBwr2GZCmQM 2. https://www.utmb.edu/pedi_ed/CoreV2/Cardiology/cardiologyV23.html	C1/C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Regulation of blood flow	Define and describe Resistance to Blood flow Describe regulation of Blood pressure and Poiseuilles law Describe factors related with Blood viscosity and its role in regulation	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05, Cardiovascular Physiology (Chapter 31, Page 575)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 02(Chapter 5, Page 107) (Chapter 6,page 110)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Section 04. (Chapter 14, Page 173) (Chapter 17, Page 205)</li> </ul>	https://youtu.be/cocB-M3h9k0     https://journals.physiology.org/doi/full/10.1152/advan.00074.2     010	C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Capillary circulation, Concept of vasomotion and starling forces	Explain the details of types of starling forces. Expalin role of starling forces in different pathological conditions	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 31, Page 577)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 170)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 02(Chapter 6,Page 119)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 04. (Chapter 16, Page 193)</li> </ul>	https://youtu.be/YNROPnYy1t     c      https://www.osmosis.org/learn/     Microcirculation and Starling     forces	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Functions of veins, Venous return and factors affecting venous return	Describe how veins are different from arteries Explain Various factors that affect venous return	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 158)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.Section 4. (Chapter 15, Page 188)</li> </ul>	https://youtu.be/FKJr5uqPv5s     https://www.sciencedirect.com/topics/medicine-and-dentistry/venous-return	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Introduction to ECG & its clinical importance	Enumerate and describe normal components of ECG Draw normal ECG Describe the method of recording ECG Describe the following. Bipolar limb leads.	Ganong's Review of Medical     Physiology.25TH Edition.Section     01,Immunity,Infection and Inflamma     tion(Chapter 29, Page 522)	https://youtu.be/SEFhbK8ZCg     k      https://my.clevelandclinic.org/     health/diagnostics/16953-     electrocardiogram-ekg	C1 C1 C1 C1 C1 C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST

	Describe Einthovians law and Enthovian triangle. Describe Chest leads and Augmented unipolar limb leads Describe how to read normal ECG Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 491)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. Chapter 09,Page 170)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03. (Chapter 11, Page 135)</li> </ul>		C1		based Assessment) OSPE
Cardiac output & its control, measurement of cardiac output, pathologically high and low cardiac output	Explain cardiac output Understand various method	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 543)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 500-507)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 149,154-158)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 04. (Chapter 20, Page 245)((Chapter 22, Page 280)</li> </ul>	1. <a href="https://youtu.be/WuGMqezV3">https://youtu.be/WuGMqezV3</a>			

Vectorial analysis & arrhythmias I	Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG Define arrhythmia Describe abnormal sinus rhythms	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 526)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.(Chapter 09,Page 179,180-189)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03.</li> <li>(Chapter 12, Page 143)((Chapter 13, Page 157)</li> </ul>	https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms_19241/     https://youtu.be/6LrptveKYus     https://www.medicalnewstoday.com/articles/8887#definition	C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Cardiac cycle - I, Events of cardiac cycle and its graphical representation	Describe the cardiac cycle in detail Enumerate and explain its events Explain the events of cardiac cycle	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03.</li> <li>(Chapter 9, Page 117)</li> </ul>	<ol> <li>https://youtu.be/XbivIaFPoQI</li> <li>https://www.sciencedirect.com/science/article/pii/S00100277         21003309</li> <li>https://youtu.be/sLLLOaZ85Lk</li> <li>https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/</li> <li>https://youtu.be/HNkwXZSSssUU</li> </ol>	C1 C1, C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Arrhythmias II	Describe abnormal rhythms resulting from the block of heart signals within the intra cardiac conduction pathways Define ectopic beats Explain the following with the help of relevant ECGs. Premature contractions. Paroxysmal tachycardia. Ventricular fibrillation. Atrial flutter. Cardiac arrest. Describe different degrees of heart block and ECG changes Explain atrial and ventricular flutter and fibrillation.	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 527)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.(Chapter 09,Page 180-189)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03. (Chapter 13, Page 157)</li> </ul>	1. https://youtu.be/6LrptveKYus 2. https://www.medicalnewstoday .com/articles/8887#definition	C1 C1 C2 C2 C2 C2 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Cardiac cycle – II, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping	Draw various events during cardiac cycle Explain regulation of heart pumping	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03.</li> <li>(Chapter 9, Page 117-126)</li> </ul>	<ol> <li>https://youtu.be/dmPtaJxgRQU</li> <li>https://youtu.be/VI9zo_CzQ9g</li> <li>https://youtu.be/pli2zs8Kekw</li> <li>https://youtu.be/kMJ-US6Qfqc</li> <li>https://youtu.be/qhtAhbyBSfs</li> <li>https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/</li> </ol>	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

ECG changes in myocardial hypertrophies, ischemic heart disease	Discuss ECG changes in different diseases	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 532)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.(Chapter 12,Page 151)</li> </ul>	https://youtu.be/SEFhbK8ZCg     k      https://youtu.be/D0V_aQXtRS     w      https://www.msdmanuals.com/     home/heart-and-blood-vessel-     disorders/diagnosis-of-heart-     and-blood-vessel-     disorders/electrocardiography	1.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Short term regulation of blood pressure	Explain short term regulation of blood pressure Explain central nervous system ischemic response & cushing reaction	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 32, Page 585,590)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15,Page 517,528)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology</li> <li>(Chapter 4,Page 163)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.(Chapter 18,Page 217)</li> </ul>	https://youtu.be/HUf1LtkPj1k     https://www.sciencedirect.com/topics/nursing-and-health-professions/blood-pressure-regulation     https://www.cliffsnotes.com/study-guides/anatomy-and-physiology/the-cardiovascular-system/control-of-blood-pressure	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Congestive cardiac failure	Define cardiac failure. Classify cardiac failure Enumerate the causes of cardiac failure and discuss in detail. Discuss and differentiate between compensated heart failure and decompensated heart failure Discuss and differentiate between Low and high output cardiac failure Define Cardiac reserve.	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 30, Page 538)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.(Chapter 22,Page 271)</li> </ul>	<ol> <li>https://www.webmd.com/heart -disease/guide-heart-failure</li> <li>https://youtu.be/EDCaFKgtXks</li> <li>https://www.healthline.com/he alth/congestive-heart-failure</li> </ol>	C1/C2 C1 C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Long term regulation of blood pressure	Explain the role of kidneys in long term regulation of blood pressure	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 16,page 282)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. (Chapter 19, Page 229)</li> </ul>	1. <a href="https://youtu.be/5S9xEpAdAg">https://youtu.be/5S9xEpAdAg</a> 2. <a href="https://jps.biomedcentral.com/a">https://jps.biomedcentral.com/a</a> <a href="rticles/10.1007/s12576-012-0192-0">rticles/10.1007/s12576-012-0192-0</a> 3. <a href="https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x">https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1681.2005.04205.x</a>	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Splanchnic circulation, cutaneous circulation	Describe the Physiologic anatomy of cerebral blood flow Describe the blood flow in normal state and local control of blood flow	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 173)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 7,page 146)</li> </ul>	1. https://youtu.be/hr6oGuW7mV A 2. https://www.sciencedirect.com /topics/medicine-and- dentistry/splanchnic-blood-flow 3. https://www.ncbi.nlm.nih.gov/ pmc/articles/PMC2999290/	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Skeletal muscle blood flow, Cardiovascular changes during exercise	Discuss the blood flow regulation in skeletal muscle at rest and during exercise.	Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 30, Page 549) Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 178) Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 07,Page 148) Textbook of Medical Physiology by Guyton & Hall.14th Edition (Chapter 18, Page 226)(Chapter 21,Page 259)	https://www.sciencedirect.com/topics/medicine-and-dentistry/muscle-blood-flow     https://youtu.be/H6Fd8sfE2eQ	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Fetal circulation & cardiac abnormalities in fetal circulation	Describe the fetal circulation Discuss the pathophysiology of cardiac abnormalities related to it	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 33, Page 614)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 4(Chapter 23,Page 288)</li> </ul>	<ol> <li>https://youtu.be/rYVGjbzmAtg</li> <li>https://www.sciencedirect.com/science/article/abs/pii/003306/2072900151</li> <li>https://myhealth.ucsd.edu/Conditions/Heart/Congenital/90,P0/1790</li> </ol>	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Circulatory Shock	Define shock. Describe the physiologic causes of shock. Enumerate various types of shock. Describe the stages of shock Describe the following types of shock in detail. Describe Circulatory shock and Hypovolemic shock. Describe Neurogenic shock. Describe Septic shock. Describe Anaphylactic shock	Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.Section 4(Chapter 24,Page 293)	1.https://youtu.be/VZtBOaAMG 9w 2. https://my.clevelandclinic.org/ health/diseases/17837- cardiogenic-shock	1.C1 2.C1 3.C1 4.C1 5.C1 6.C1 7.C1 8.C1 9.C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Coronary circulation, Atherosclerosis & acute coronary occlusion	Understand the physiologic anatomy of coronary blood supply and normal coronary blood flow Discuss the control of coronary blood flow	Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 33, Page 610) Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 15,Page 265) Textbook of Medical Physiology by Guyton & Hall.14th Edition (Chapter 21, Page 262)	<ol> <li>https://www.msdmanuals.com/professional/cardiovascular-disorders/coronary-artery-disease/overview-of-coronary-artery-disease</li> <li>https://youtu.be/WKrVxKJVh000</li> <li>https://www.uptodate.com/contents/mechanisms-of-acute-coronary-syndromes-related-to-atherosclerosis</li> </ol>	1.C2 2.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Cardiac cycle, Events of cardiac cycle and its graphical representation, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping (SDL)	Enumerate and explain its events Explain the events of cardiac cycle	<ul> <li>Ganong's Review of Medical Physiology.25TH         Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03.</li> <li>(Chapter 9, Page 117)</li> </ul>	<ol> <li>https://youtu.be/XbivIaFPoQI</li> <li>https://www.sciencedirect.com/science/article/pii/S00100277         21003309</li> <li>https://youtu.be/sLLLOaZ85Lk</li> <li>https://teachmephysiology.com/cardiovascular-system/cardiac-cycle-2/cardiac-cycle/</li> <li>https://youtu.be/HNkwXZSSssU</li> </ol>	C1 C1/C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
---	--	--	--	-------------------	------	---

Capillary circulation, Concept of vasomotion and starling forces	Explain the details of types of starling forces . Expalin role of starling forces in different pathological conditions	<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Section 04. (Chapter 14, Page 173) (Chapter 17, Page 205)</li> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 31, Page 577)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 170)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 02(Chapter 6,Page 119)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 04. (Chapter 16, Page 193)</li> </ul>	1. https://youtu.be/YNROPnYy1t c 2. https://www.osmosis.org/learn/ Microcirculation and Starling forces	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Functions of veins, Venous return and factors affecting venous return	Describe how veins are different from arteries Explain Various factors that affect venous return	<ul> <li>Physiology by Linda S. Costanzo 6<sup>th</sup>         Edition.Cardiovascular Physiology         (Chapter 4,Page 158)</li> <li>Textbook of Medical Physiology by         Guyton &amp; Hall.14<sup>th</sup> Edition.Section 4.         (Chapter 15, Page 188)</li> </ul>	https://youtu.be/FKJr5uqPv5s     https://www.sciencedirect.com/topics/medicine-and-dentistry/venous-return	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Introduction to ECG & its clinical importance	Enumerate and describe normal components of ECG Draw normal ECG Describe the method of recording ECG Describe the following. Bipolar limb leads.	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 01,Immunity,Infection and Inflamma tion(Chapter 29, Page 522)	https://youtu.be/SEFhbK8ZCg     k      https://my.clevelandclinic.org/     health/diagnostics/16953-     electrocardiogram-ekg	C1 C1 C1 C1 C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST

	Describe Einthovians law and Enthovian triangle. Describe Chest leads and Augmented unipolar limb leads Describe how to read normal ECG Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 491)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Chapter 09,Page 170)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 11, Page 135)</li> </ul>		C1		based Assessment) OSPE
Cardiac output & its control, measurement of cardiac output, pathologically high and low cardiac output	Explain cardiac output Understand various method to measure cardiac output Explain various factor which help in regulation of heart rate and stroke volume	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 30, Page 543)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 500-507)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 149,154-158)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 04. (Chapter 20, Page 245)((Chapter 22, Page 280)</li> </ul>	https://youtu.be/WuGMqezV3e     o     https://teachmephysiology.com /cardiovascular- system/cardiac-output/	C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Vectorial analysis & arrhythmias I	Describe the principles of vectorial analysis of ECG. Describe the vectorial analysis of normal ECG Define arrhythmia Describe abnormal sinus rhythms	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 29, Page 526)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 09,Page 179,180-189)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03.</li> </ul>	<ol> <li>https://www.brainkart.com/article/Principles-of-Vectorial-Analysis-of-Electrocardiograms 19241/</li> <li>https://youtu.be/6LrptveKYus</li> <li>https://www.medicalnewstoday.com/articles/8887#definition</li> </ol>	C1 C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)

		(Chapter 12, Page 143)((Chapter 13, Page 157)					OSPE
Cardiac cycle - I, Events of cardiac cycle and its graphical representation	Describe the cardiac cycle in detail Enumerate and explain its events Explain the events of cardiac cycle	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 9, Page 117)</li> </ul>	1. 2. 3. 4.	https://youtu.be/XbivIaFPoQI https://www.sciencedirect.com /science/article/pii/S00100277 21003309 https://youtu.be/sLLLOaZ85Lk https://teachmephysiology.com /cardiovascular- system/cardiac-cycle- 2/cardiac-cycle/ https://youtu.be/HNkwXZSSss U	C1 C1, C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Arrhythmias II	Describe abnormal rhythms resulting from the block of heart signals within the intra cardiac conduction pathways Define ectopic beats Explain the following with the help of relevant ECGs. Premature contractions. Paroxysmal tachycardia. Ventricular fibrillation. Atrial fibrillation. Atrial flutter. Cardiac arrest. Describe different degrees of heart block and ECG changes Explain atrial and ventricular flutter and fibrillation	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 29, Page 527)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 09,Page 180-189)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 13, Page 157)</li> </ul>	1. 2.	https://youtu.be/6LrptveKYus https://www.medicalnewstoday .com/articles/8887#definition	C1 C1 C2 C2 C2 C2 C2 C2 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Cardiac cycle – II, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping	Draw various events during cardiac cycle Explain regulation of heart pumping	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 9, Page 117-126)</li> </ul>	1. 2. 3. 4. 5. 6.	https://youtu.be/dmPtaJxgRQU https://youtu.be/VI9zo_CzQ9g https://youtu.be/pli2zs8Kekw https://youtu.be/kMJ-US6Qfqc https://youtu.be/qhtAhbyBSfs https://teachmephysiology.com /cardiovascular- system/cardiac-cycle- 2/cardiac-cycle/	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
ECG changes in myocardial hypertrophies, ischemic heart disease	Discuss ECG changes in different diseases	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 29, Page 532)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 12,Page 151)</li> </ul>	•	https://youtu.be/SEFhbK8ZCg k https://youtu.be/D0V_aQXtRS w https://www.msdmanuals.com/ home/heart-and-blood-vessel- disorders/diagnosis-of-heart- and-blood-vessel- disorders/electrocardiography	1.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Short term regulation of blood pressure	Explain short term regulation of blood pressure Explain central nervous system ischemic response & cushing reaction	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 32, Page 585,590)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 15,Page 517,528)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> </ul>	1. 2. 3.	https://youtu.be/HUf1LtkPj1k https://www.sciencedirect.com /topics/nursing-and-health- professions/blood-pressure- regulation https://www.cliffsnotes.com/st udy-guides/anatomy-and- physiology/the-cardiovascular-	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

		Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition.(Chapter 18,Page 217)	system/control-of-blood- pressure	01/02		
Congestive cardiac failure	Define cardiac failure. Classify cardiac failure Enumerate the causes of cardiac failure and discuss in detail. Discuss and differentiate between compensated heart failure and decompensated heart failure Discuss and differentiate between Low and high output cardiac failure Define Cardiac reserve.	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 30, Page 538)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 22,Page 271)</li> </ul>	<ol> <li>https://www.webmd.com/hear-disease/guide-heart-failure</li> <li>https://youtu.be/EDCaFKgtXk</li> <li>https://www.healthline.com/health/congestive-heart-failure</li> </ol>	C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Long term regulation of blood pressure	Explain the role of kidneys in long term regulation of blood pressure	<ul> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 16,page 282)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 19, Page 229)</li> </ul>	<ol> <li>https://youtu.be/5S9xEpAdAgAgAgAgAgAgAgAgAgAgAgAgAgAgAgAgAgAgA</li></ol>		LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Splanchnic circulation, cutaneous circulation	Describe the Physiologic anatomy of cerebral blood flow Describe the blood flow in normal state and local control of blood flow	<ul> <li>Physiology by Linda S. Costanzo 6<sup>th</sup>         Edition.Cardiovascular Physiology         (Chapter 4,Page 173)     </li> <li>Physiological Basis of Medical Practice         by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 7,page 146)     </li> </ul>	https://youtu.be/hr6oGuW7mV     A      https://www.sciencedirect.com/topics/medicine-and-dentistry/splanchnic-blood-flow	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)

			3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2999290/			OSPE
Skeletal muscle blood flow, Cardiovascular changes during exercise	Discuss the blood flow regulation in skeletal muscle at rest and during exercise.	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 05(Chapter 30, Page 549) Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 178) Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition.(Chapter 07,Page 148) Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition (Chapter 18, Page 226)(Chapter 21,Page 259)	https://www.sciencedirect.com /topics/medicine-and- dentistry/muscle-blood-flow     https://youtu.be/H6Fd8sfE2eQ	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Fetal circulation & cardiac abnormalities in fetal circulation	Describe the fetal circulation Discuss the pathophysiology of cardiac abnormalities related to it	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05(Chapter 33, Page 614)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 4(Chapter 23,Page 288)</li> </ul>	<ol> <li>https://youtu.be/rYVGjbzmAtg</li> <li>https://www.sciencedirect.com /science/article/abs/pii/003306 2072900151</li> <li>https://myhealth.ucsd.edu/Con ditions/Heart/Congenital/90,P0 1790</li> </ol>	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Circulatory Shock	Define shock. Describe the physiologic causes of shock. Enumerate various types of shock. Describe the stages of shock Describe the following types of shock in detail.	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 4(Chapter 24,Page 293)</li> </ul>	1.  https://youtu.be/VZtBOaAMG  9w  2. https://my.clevelandclinic.org/ health/diseases/17837- cardiogenic-shock	1.C1 2.C1 3.C1 4.C1 5.C1 6.C1 7.C1 8.C1 9.C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST

	Describe Circulatory shock and Hypovolemic shock. Describe Neurogenic shock. Describe Septic shock. Describe Anaphylactic shock						based Assessment) OSPE
Coronary circulation, Atherosclerosis & acute coronary occlusion	Understand the physiologic anatomy of coronary blood supply and normal coronary blood flow Discuss the control of coronary blood flow	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 05(Chapter 33, Page 610) Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition.(Chapter 15,Page 265) Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition (Chapter 21, Page 262)	<ol> <li>1.</li> <li>2.</li> <li>3.</li> </ol>	https://www.msdmanuals.com/ professional/cardiovascular- disorders/coronary-artery- disease/overview-of-coronary- artery-disease https://youtu.be/WKrVxKJVh0 0 https://www.uptodate.com/cont ents/mechanisms-of-acute- coronary-syndromes-related- to-atherosclerosis	1.C2 2.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Cardiac cycle, Events of cardiac cycle and its graphical representation, Functions of ventricles as pumps, aortic pressure curve, regulation of heart pumping (SDL)	Describe the cardiac cycle in detail Enumerate and explain its events Explain the events of cardiac cycle	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 03. (Chapter 9, Page 117)</li> </ul>	1. 2. 3. 4.	https://youtu.be/XbivIaFPoQI https://www.sciencedirect.com /science/article/pii/S00100277 21003309 https://youtu.be/sLLLOaZ85Lk https://teachmephysiology.com /cardiovascular- system/cardiac-cycle- 2/cardiac-cycle/ https://youtu.be/HNkwXZSSss U	C1 C1/C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

# **Biochemistry Large Group Interactive Session (LGIS)**

Definition and Biological importance of lipids.  Definition and Biological importance of lipids.  Patty acids  Fatty acids  Patty acids  Describe Physical and chemical properties of fatty acids  Describe physical and chemical properties of Triglycerides  Elaborate Structure and physical properties of Triglycerides  Discuss Chemical properties of Triglycerides  Discuss Chemical properties of Triglycerides and their clinical significance  Discuss Chemical properties of Triglycerides and their clinical significance  Discuss Structure and functions of compound lipids  Describe derived lipids  Describe derived lipids  Describe derived lipids  Describe Structure and physical properties of Collesterol  Describe derived lipids  Describe derived lipids  Describe Structure and physical properties of Cholesterol  Describe derived lipids  Describe derived lipids  Describe Structure and physical properties of Cholesterol  Describe derived lipids  Describe derived lipids	Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Definition and Biological importance of lipids.  - Classify lipids - Describe Biomedical significance of lipids - Describe Biomedical significance of lipids - Describe physical and chemical properties of fatty acids - Describe physical and chemical properties of fatty acids - C2				Strategy	
Describe Biomedical significance of lipids   C2	Definition and Biological			LGIS	_
Fatty acids  - Classify fatty acids - Describe physical and chemical properties of fatty acids - Describe physical and chemical properties of Triglycerides - Discuss Chemical properties of Triglycerides and their clinical significance - Classify compound lipids - Phospholipids, elycolipids, lipoproteins) - Describe derived lipids - Describe derived lipids - Describe derived lipids - Describe derived lipids - Describe Structure and physical properties of Cholesterol - Discuss Chemical properties and functions - Describe Structure and physical properties of Cholesterol - Discuss Chemical properties and functions - Describe functions and clinical significance of Prostaglandins - Discuss Different types of carbohydrates and their clinical significance - Carbohydrate Chemistry - Carbohydrate Chemistry - Discuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation) - Discuss Different properties of monosaccharide - Classify monosaccharide - Classify monosaccharide - Discussification of carbohydrates of monosac	e				
Simple lipids  - Elaborate Structure and physical properties of Triglycerides  - Discuss Chemical properties of Triglycerides and their clinical significance  - C2			C1		MCQs
Simple lipids    Elaborate Structure and physical properties of Triglycerides	Fatty acids	Describe physical and chemical properties of fatty acids	C2	LGIS	
Ompound lipids (Phospholipids, glycolipids, lipoproteins)  Perived lipids  Cholesterol  Cholesterol  Prostaglandins  Prostaglandins  Prostaglandins  Prostaglandins  Prostaglandins  Describe functions and claised significance of postaglandins carbohydrates  LGIS saqs  Wiva  CC2 LGIS SAQs  Wiva  MCQs  MCQs  MCQs  MCQs  LGIS  SAQs  Viva  CC2 LGIS  MCQs  MCQs  MCQs  MCQs  MCQs  MCQs  LGIS  SAQs  Viva  MCQs  LGIS  SAQs  Viva  CC2 LGIS  SAQs  Viva  CC3 LGIS  SAQs  Viva  MCQs  LGIS  SAQs  Viva  CC2  LGIS  SAQs  Viva  CC3  LGIS  SAQs  Viva  MCQs  SAQs  Viva  CC4  LGIS  SAQs  Viva  CC5  LGIS  SAQs  Viva  CC7  LGIS  SAQs  Viva  CC8  LGIS  SAQs  Viva  CC9  LGIS  SAQs  Viva  Carbohydrate Chemistry  Carbohydrate Chemistry  Discuss Different types of carbohydrates (Isomerism, optical activityand mutarotation)  CC8  CC9  CC9  LGIS  MCQs  SAQs  CC9  LGIS  SAQs  MCQs  SAQs  Viva  CC9  LGIS  SAQs  MCQs  SAQs  Viva  CC9  LGIS  SAQs  Viva  CC9  LGIS  SAQs  Viva  CC9  LGIS  SAQs  MCQs  SAQs  Viva  CC9  LGIS  SAQs  Viva  CC9  LGIS  SAQs  MCQs  SAQs  Viva  CC9  LGIS  SAQs  Viva  CC9  CC9  LGIS  SAQs  Viva  CC9  CC9  LGIS  CC9  LGIS  CC9  LGIS  CC9  LGIS  CC9  LGIS  CC9  L	G. 1 1	Elaborate Structure and physical properties of Triglycerides	C2	T GTG	MCQs
Compound lipids (Phospholipids, glycolipids, lipoproteins)  Derived lipids  Cholesterol  Cholesterol  Prostaglandins  Prostaglandins  Prostaglandins  Describe derived lipids  Classify carbohydrates  Classify carbohydrates  Describe derived lipids  Classify carbohydrates  Carbohydrates  Classify carbohydrates  Discuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  Classify monosaccharide  Acceptage and functions of compound lipids  Classify carbohydrates  Classify nonosaccharide  Classify monosaccharide  Classify monosaccharide	Simple lipids	Discussion of Trial and Administration of Community and	C2	LGIS	
(Phospholipids, glycolipids, lipoproteins)  Derived lipids  Derived lipids  Obscribe Structure and physical properties of Cholesterol  Obscribe Structure and functions  Occupancy  Occ	C 11' '1				
Describe derived lipids   C2		· · · · · · · · · · · · · · · · · · ·		I CIC	_
Derived lipids  • Describe derived lipids  • Describe Structure and physical properties of Cholesterol  Cholesterol  • Describe Structure and physical properties of Cholesterol  • Discuss Chemical properties and functions  • Discuss Chemical properties and functions  • Interpret clinical findings of hypercholesterolemia  C3 Wiva  Prostaglandins  C2 LGIS SAQs  Viva  Carbohydrate Of Prostaglandins  C2 LGIS SAQs  Viva  Carbohydrate Chemistry  Introduction and classification of carbohydrates  Carbohydrate Chemistry  • Classify carbohydrates  • Explain different types of carbohydrates and their clinical significance  C2 LGIS SAQs  Viva  Carbohydrate Chemistry  • Discuss Different properties of carbohydrates (Isomerism, optical activityand mutarotation)  • Classify monosaccharide  • Carbohydrates of ca				LGIS	_
Derived lipids    Derived lipids	gryconpius, npoproteins)				
Cholesterol Cholesterol Cholesterol Cholesterol Cholesterol Cholesterol Cholesterol Discuss Chemical properties and functions Interpret clinical findings of hypercholesterolemia Casuman Classify Prostaglandins Casuman Classify Prostaglandins Casuman Classify Prostaglandins Carbohydrate Chemistry  Introduction and classify carbohydrates Cabrohydrates Carbohydrates Cabrohydrates Cabrohydrates Carbohydrates	Davis - 11: - 11-	Describe derived lipids	C2	I CIC	
Cholesterol  Cholesterol  Cholesterol  Describe Structure and physical properties of Cholesterol  Discuss Chemical properties and functions  Interpret clinical findings of hypercholesterolemia  Caussify Prostaglandins  Caussify Prostaglandins  Caussify Prostaglandins  Caussify Prostaglandins  Describe functions and clinical significance of Prostaglandins.  Interpret the role of drugs in prostaglandin synthesis  Carbohydrate Chemistry  Carbohydrate Chemistry  Carbohydrate Chemistry  Carbohydrate Chemistry  Carbohydrates  Explain different types of carbohydrates and their clinical significance  Explain different types of carbohydrates (Isomerism, optical activity and mutarotation)  Carbohydrates  Caussify carbohydrates (Isomerism, optical activity and mutarotation)	Derived lipids			LGIS	
Cholesterol  Discuss Chemical properties and functions  Interpret clinical findings of hypercholesterolemia  Classify Prostaglandins  Classify Prostaglandins  Describe functions and clinical significance of Prostaglandins.  Describe functions and clinical significance of Prostaglandins.  Classify Prostaglandins  Describe functions and clinical significance of Prostaglandins.  Classify Carbohydrates  Carbohydrate Chemistry  Carbohydrate Chemistry  Explain different types of carbohydrates and their clinical significance  Classify carbohydrates  Explain different types of carbohydrates (Isomerism, optical activity and mutarotation)  Discuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  Classify monosaccharide  Classify monosaccharide  Classify monosaccharide  Describe chemical properties of monosaccharide  Describe chemical properties of monosaccharide  Interpret the clinical role of sorbitol, mannitol and cardiac glycosides  Classify monosaccharide  Classify monosaccharide  Interpret the clinical role of sorbitol, mannitol and cardiac glycosides		Describe Structure and physical properties of Cholesterol	C2		
Prostaglandins  Prostaglandins  Classify Prostaglandins  Classify Prostaglandins  Describe functions and clinical significance of Prostaglandins.  Classify Prostaglandins  Describe functions and clinical significance of Prostaglandins.  Classify Carbohydrates  Carbohydrate Chemistry  Introduction and classification of carbohydrates  Carbohydrates  Explain different types of carbohydrates and their clinical significance  Discuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  Policuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  Classify monosaccharide  Classify monosaccharide  Classify monosaccharide  Classify monosaccharide  Classify monosaccharide  Classify monosaccharide  Describe chemical properties of monosaccharide  Interpret the clinical role of sorbitol, mannitol and cardiac glycosides  Coarbohydrates  Coarbohyd	Cholesterol			LGIS	_
Prostaglandins  Classify Prostaglandins Describe functions and clinical significance of Prostaglandins. Interpret the role of drugs in prostaglandin synthesis Carbohydrate Chemistry  Introduction and classification of carbohydrates Carbohydrates Carbohydrates Explain different types of carbohydrates and their clinical significance Carbohydrates  Discuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  Occupance of Prostaglandins Carbohydrates Carbohydrate Chemistry  Carbohydrate Chemistry  Occupance of Prostaglandins Carbohydrates Occupance oc	Cholesteror			Lois	-
Prostaglandins  Describe functions and clinical significance of Prostaglandins. Interpret the role of drugs in prostaglandin synthesis  Carbohydrate Chemistry  Introduction and classification of carbohydrates  Explain different types of carbohydrates and their clinical significance  Discuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  Policus Discuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  Carbohydrate Chemistry  Carboh			C2		
• Interpret the role of drugs in prostaglandin synthesis  Carbohydrate Chemistry  Introduction and classification of carbohydrates  • Explain different types of carbohydrates and their clinical significance  • Discuss Different properties of carbohydrates (Isomerism, optical activityand mutarotation)  Isomerism, optical activity and mutarotation  • Classify monosaccharide  • Classify monosaccharide  • Classify monosaccharide  • Classify monosaccharide  • Describe chemical properties of monosaccharide  • Interpret the clinical role of sorbitol, mannitol and cardiac glycosides  • Interpret the clinical role of sorbitol, mannitol and cardiac glycosides	Prostaglandins	•		LGIS	_
Introduction and classification of carbohydrates  Isomerism, optical activity and mutarotation  Monosaccharide  Carbohydrate Chemistry  Carbohydrates (Isomerism, optical activityand mutarotation)  Carbohydrates (Isomerism, optical activityand mutarotation)  Carbohydrate Chemistry  Carbohydrates (Isomerism, optical activityand mutarotation)  Carbohydrates (Isomerism, optical	C				_
Introduction and classification of carbohydrates  • Classify carbohydrates  • Explain different types of carbohydrates and their clinical significance carbohydrates  • Discuss Different properties of carbohydrates (Isomerism, optical activityand mutarotation)  • Classify monosaccharide  • Classify monosaccharide  • Classify monosaccharide  • Describe chemical properties of monosaccharide  • Interpret the clinical role of sorbitol, mannitol and cardiac glycosides  • Classify monosaccharide  • Classify monosaccharide  • Describe chemical properties of monosaccharide  • Interpret the clinical role of sorbitol, mannitol and cardiac glycosides					I .
classification of carbohydrates  • Explain different types of carbohydrates and their clinical significance viva  • Discuss Different properties of carbohydrates (Isomerism, optical activityand mutarotation)  • Classify monosaccharide  Monosaccharide  • Classify monosaccharide  • Describe chemical properties of monosaccharide  • Interpret the clinical role of sorbitol, mannitol and cardiac glycosides  • Explain different types of carbohydrates and their clinical significance  C2	Introduction and		C2		MCQs
Isomerism, optical activity and mutarotation  Obscuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  Obscuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  Obscuss Different properties of carbohydrates (Isomerism, optical activity and mutarotation)  C2  MCQs  SAQs  Viva  Obscribe chemical properties of monosaccharide  Obscribe chemical properties of monosaccharide  Interpret the clinical role of sorbitol, mannitol and cardiac glycosides  Obscribe chemical properties of monosaccharide  Interpret the clinical role of sorbitol, mannitol and cardiac glycosides				LGIS	SAQs
Isomerism, optical activity and mutarotation  Output	carbonyarates		C2		
Monosaccharide  Classify monosaccharide  Classify monosaccharide  Classify monosaccharide  Describe chemical properties of monosaccharide  Interpret the clinical role of sorbitol, mannitol and cardiac glycosides  Viva  C2  LGIS  SAQs  Viva	Isomovism ontical		C2	I CIC	
Monosaccharide  • Classify monosaccharide  • Describe chemical properties of monosaccharide  • Interpret the clinical role of sorbitol, mannitol and cardiac glycosides  • C2  C2  LGIS  SAQs  Viva		mutarotation)		LGIS	
Monosaccharide  • Describe chemical properties of monosaccharide  • Interpret the clinical role of sorbitol, mannitol and cardiac glycosides  C2 LGIS SAQs Viva	activity and mutarotation	Classify managagaharida	C2		
Interpret the clinical role of sorbitol, mannitol and cardiac glycosides     C3     Viva	Monosaccharide			LGIS	_
and the state of solution and the state of solution state of the state of solution state of solution state of solution state of solution state of solutions state of	Monosaccharac			LOID	
The Describe Numering and Indicators of Individual Sugars and the first transfer in the		<ul> <li>Describe Structure and functions of Individual sugars</li> </ul>	C2		MCQs

Disaccharides			LGIS	SAQs
				Viva
	Explain Structure, physical and chemical properties of	C2		MCQs
Homopolysaccharides	homopolysaccharide and their biological importance.		LGIS	SAQs
. ,				Viva
	Explain Structure, physical and chemical properties of	C2		MCQs
Heteropolysaccharides	heteropolysaccharides and their biological importance.		LGIS	SAQs
	Apply the role of heteropolysaccharides in clinical cases	C3		Viva

## **Anatomy Small Group Discussion (SGDs)**

Topic	At the End Of The Session Students Should Be Able To:	Learning Domains	Teaching Strategy	Assessment Tools
	Define thorax	C1	z ez es eg j	2 0 0 2 0
	Discuss components and shape of thoracic cavity.	C2		
	Discuss the applied and the related clinical anatomy	C2		MCQ
Thoracic Wall / Thoracic	Tabulate origin, insertion, nerve supply and action of all muscles of posterior compartment of leg	C2	SGD, Skill Lab	SAQ VIVA
Vertebra	Classify Ribs	C1		OSPE
	Correlate the clinical conditions	C3		
	• Describe ribs (side determination, features, attachments, relations, types and ossification.	C2		
	Practice the principles of Bioethics	C3		
	Correlate the clinical conditions	C3		
	To understand the Biophysiological aspects of Thoracic wall	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	Discuss the boundaries and division of mediastinum	C2		
	• Enumerate the contents of anterior mediastinum.	C1		MCQ
	Correlate the clinical conditions	C3	SGD,	SAQ
Mediastinum	To understand the Biophysiological aspects of Mediastinum	C3	Skill Lab	VIVA
	• Able to focus on provision of curative and preventive health care measures	C3		OSPE
	Map Arch of Aorta, Bracheocephalic artery on SP/Model	P		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	• Describe the gross features of fibrous pericardium with its blood and nerve supply	C2		
Pericardium	• Describe the gross features of serous pericardium with its blood and nerve supply	C2	SGD, Skill Lab	MCQ SAQ
	Describe transverse and oblique pericardial sinus	C2		VIVA
	Describe the Clinical Significance of the Transverse Pericardial Sinus	C3		OSPE
	Define Pericarditis and Pericardial Effusion	C1		
	Correlate the clinical conditions	C3		
	To understand the Biophysiological aspects of Pericardium	C3		

	Able to focus on provision of curative and preventive health care measures	C3		
	Map Pericardium on SP/Model	C3		
	• Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	• Demonstrate Position and orientation of heart.	P		
Heart (External	• Describe borders and surfaces of the heart.	C2		
features)	• Demonstrate the external features of the heart	C2	SGD,	MCQ
	Correlate the clinical conditions	C3	Skill Lab	SAQ
	• To understand the Biophysiological aspects of Heart(External Feature)	C3	]	VIVA
	• Able to focus on provision of curative and preventive health care measures	C3	]	OSPE
	Practice the principles of Bioethics	C3	]	
	Apply strategic use of AI in health care	C3	1	
	Read relevant research article	C3	1	
	Use HEC digital library	C3	1	
	Differentiate between muscular and smooth part.	C2		
	• Identify the various openings, important features in inter-atrial septum.	C2	1	
	• Identify S.A node	C1	SGD,	MCQ
	• Discuss internal features of left atrium, inter atrial septum, mitral valve and pulmonaryveins.	C2	Skill Lab	SAQ VIVA
Heart (Internal	Discuss importance of modulator band.	C2	-	OSPE
features)	<ul> <li>Identify mitral valve, intervetntricular septum, aortic vestibule, arotic valve.</li> </ul>	C3	-	
	Correlate the clinical conditions	C3	-	
	• To understand the Biophysiological aspects of Heart (Internal features)	C3	-	
	Able to focus on provision of curative and preventive health care measures	C3	-	
	Map Cardiac valves on SP/Model	P	1	
	Practice the principles of Bioethics	C3	1	
	Apply strategic use of AI in health care	C3	1	
	Read relevant research article	C3	1	
	Use HEC digital library	C3	-	
Heart	Coronary Atherosclerosis	C1	SGD,	MCQ
(Clinical	Myocardial Infarction	C1	Skill Lab	SAQ
Cillicui				

	Coronary Angioplasty	C1		OSPE
	• Correlate the clinical conditions	C2		
	• To understand the Biophysiological aspects of Heart (Clinical Correlations)	C3		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	• Read relevant research article	C3		
Vasculature of heart	• Describe the origin of coronary arteries	C2		
	<ul> <li>Identify course branches and distribution of right coronary arteries and left coronaryartery,</li> </ul>	C1	SGD,	MCQ
	Discuss the concept of right and left dominance.	C2	Skill Lab	SAQ
	Describe the venous drainage of heart.	C2	1	VIVA
	Correlate the clinical conditions	C3	1	OSPE
	• To understand the Biophysiological aspects of Vasculature of heart	C3	1	
	• Able to focus on provision of curative and preventive health care measures	C3	]	
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3	]	
Innervation of	• Describe the formation of superficial and deep cardiac plexus.	C2		
Heart	• Correlate the clinical conditions	C3		
	• To understand the Biophysiological aspects of Innervation of Heart	C3	SGD,	MCQ SAQ
	• Able to focus on provision of curative and preventive health care measures	C3	Skill Lab	
	• Practice the principles of Bioethics	C3		VIVA OSPE
	• Apply strategic use of AI in health care	C3		USPE
	• Read relevant research article	C3		
Superior	• Enumerate the structure of superior mediastinum	C1		
mediastinum	• Describe great vessels in superior mediastinum	C2		
(Trachea,	• Correlate the clinical conditions	C3	SGD,	MCQ
Esophagus, Ascending Aorta)	• To understand the Biophysiological aspects of Superior Mediastinum	C3	Skill Lab	SAQ
	• Able to focus on provision of curative and preventive health care measures	C3		VIVA OSPE
	Map Ascending Aorta on SP/Model	P		OSPE
	• Practice the principles of Bioethics	C3		
	• Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		

	Identify structures in posterior mediastinum	C1		
Posterior	Describe anatomy of structure in Posterior mediastinum	C2		
mediastinum	• Identify course, relations and branches of descending aorta.	C2	SGD,	MCQ
(Boundaries and	Correlate the clinical conditions	C2	Skill Lab	SAQ
Structures	To understand the Biophysiological aspects of Posteror mediastinum	C3		VIVA
	Able to focus on provision of curative and preventive health care measures	C3		OSPE
	Map Descending Thoracic Aorta on SP/Model	P		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
Posterior	• Describe formation, course and clinical importance of azygos system of veins	C3		
mediastinum	Describe formation and importance of hemiazygos vein	C1		
(Azygos system)	Correlate the clinical conditions	C3	SGD,	MCQ SAQ VIVA OSPE
	To understand the Biophysiological aspects of Posterior mediastinum	C3	Skill Lab	
	• Able to focus on provision of curative and preventive health care measures	C3		
	Practice the principles of Bioethics	C3		USPE
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
Cross sectional	• Identify the surfaces present at different levels of cross sections	P		
Anatomy/	Manubriosternal Joint/Angle of Louis	P		
Radiology	Upper body of Sternum	P	a cop	
	• Section between T 7, T 8 Thoracic vertebrae	P	SGD, Skills lab	SAQ VIVA
	• Section between T 8, T 9 Thoracic vertebrae	P	SKIIIS IAU	OSPE
	• Section between T 9, T 10 Thoracic vertebrae	P		
	How to access HEC digital library	C3		
	Correlate the clinical conditions	C2		
	• Able to focus on provision of curative and preventive health care measures	C3		
	• Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		

## **Physiology Small Group Discussion (SGDs)**

Topics	<b>Learning Objectives</b>	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Capillary circulation, Concept of vasomotion and starling forces	Explain the details of types of starling forces . Expalin role of starling forces in different pathological conditions	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 31, Page 577)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 170)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 02(Chapter 6,Page 119)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 04. (Chapter 16, Page 193)</li> </ul>	<ul> <li>3. <a href="https://youtu.be/YNROPnYy1tc">https://youtu.be/YNROPnYy1tc</a></li> <li>4. <a href="https://www.osmosis.org/learn/Microcirculation and Starling_forces">https://www.osmosis.org/learn/Microcirculation and Starling_forces</a></li> </ul>	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Short term regulation of blood pressure	Explain short term regulation of blood pressure Explain central nervous system ischemic response & cushing reaction	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 32, Page 585,590)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15,Page 517,528)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.(Chapter 18,Page 217)</li> </ul>	<ol> <li>https://youtu.be/HUf1LtkPj1k</li> <li>https://www.sciencedirect.com/topics/nursing-and-health-professions/blood-pressure-regulation</li> <li>https://www.cliffsnotes.com/study-guides/anatomy-and-physiology/the-cardiovascular-system/control-of-blood-pressure</li> </ol>	C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Long term regulation of blood pressure	Explain the role of kidneys in long term regulation of blood pressure	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 16,page 282)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. (Chapter 19, Page 229)</li> </ul>	<ol> <li>https://youtu.be/5S9xEpAdAg         <u>A</u></li> <li>https://jps.biomedcentral.com/a         rticles/10.1007/s12576-012-         <u>0192-0</u></li> <li>https://onlinelibrary.wiley.com         /doi/10.1111/j.1440-         <u>1681.2005.04205.x</u></li> </ol>	C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
--	---	--	--	----	------	---

## **Biochemistry Small Group Discussion (SGDs)**

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Introduction of lipids	Classify lipids and carbohydrates	C1		MCQs,
and carbohydrates	Discuss importance of lipids and carbohydrates	C2	SGD	SAQs Viva
	Classify fatty acids	C1		MCQs
Fatty acids	Describe physical and chemical properties of fatty acids	C2	SGD	SAQs Viva
	<ul> <li>Describe Structure and physical properties of Cholesterol</li> </ul>	C2	SGD	MCQs
Cholesterol	Discuss Chemical properties and functions	C2		SAQs
	Interpret clinical findings of hypercholesterolemia	C3		Viva
Heteropolysaccharides	<ul> <li>Explain Structure, physical and chemical properties ofheteropolysaccharides and their biological</li> </ul>	C2	SGD	MCQs
	<ul><li>importance.</li><li>Apply the role of heteropolysaccharides in clinicalcases</li></ul>	C3		SAQs Viva

# **Anatomy Self-Directed Learning (SDL)**

Topics	Learning objectives	Learning Resources
	Define thorax	Clinically Oriented Anatomy6th Edition,
	Discuss components and shape of thoracic cavity.	Pg no.73,77, 78-79,
Posterior compartment	Discuss the applied and the related clinical anatomy	84,89,93,95,98,446,454
of leg and flexor	Classify Ribs	https://youtu.be/PoA-Uq9w-7s https://youtu.be/Ok8-
retinaculum	• Describe ribs (side determination, features, attachments, relations, types and ossification.	nwVLysM https://www.sciencedirect.com/science/a rticle/pii/S0161475415000639
	Discuss the applied and the related clinical anatomy	
	How to access HEC digital library	
	How to read relevant research article	
	Define thorax	Clinically Oriented Anatomy6th Edition, P
	Discuss components and shape of thoracic cavity.	no.107,110,118,127,128,132-133,160-168,171
Mediastinum	Discuss the applied and the related clinical anatomy	https://youtu.be/oBR9p_UDTuo
	How to read relevant research article	https://www.ncbi.nlm.nih.gov/pmc/articles/ PMC5111324/
	• Describe the gross features of fibrous pericardium with its bloodand nerve supply	• Clinically Oriented Anatomy6th Edition, P no.111,128-129,133-134
	• Describe the gross features of serous pericardium with its bloodand nerve	https://youtu.be/5RMeCgJn730
D ' 1'	supply	https://www.sciencedirect.com/science/a
Pericardium	Describe transverse and oblique pericardial sinus	rticle/abs/pii/S1054880721000302
	Describe the Clinical Significance of the Transverse PericardialSinus	
	Define Pericarditis and Pericardial Effusion	
	How to access HEC digital library	
	How to read relevant research article	
	Demonstrate Position and orientation of heart.	Clinically Oriented Anatomy6th Edition,
	Describe borders and surfaces of the heart.	P no.129,135-137,144-149,153-159,171-172
Heart I External	Demonstrate the external features of the heart	https://youtu.be/uhSBFOTwzDQ
features	How to access HEC digital library	https://www.ahajournals.org/doi/full/10.
	How to read relevant research article	<u>1161/JAHA.122.028014</u>
Heart II Internal	Differentiate between muscular and smooth part.	Clinically Oriented Anatomy6th Edition,
features	• Identify the various openings, important features in inter-atrialseptum.	P no.129,135-137,144-149,153-159,171-172
	Identify S.A node	

	How to access HEC digital library	•	https://youtu.be/uhSBFOTwzDQ
	How to read relevant research article		https://www.ahajournals.org/doi/full/10. 1161/JAHA.122.028014
Heart III Clinical Co- Relation	• Discuss internal features of left atrium, inter atrial septum, mitralvalve and pulmonary veins.	•	Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 <a href="https://youtu.be/uhSBFOTwzDQ">https://youtu.be/uhSBFOTwzDQ</a> <a href="https://www.ahajournals.org/doi/full/10.">https://www.ahajournals.org/doi/full/10.</a> <a href="https://www.ahajournals.org/doi/full/10.">1161/JAHA.122.028014</a>
Heart III Clinical Co- Relation	<ul> <li>Discuss importance of modulator band.</li> <li>Identify mitral valve, intervetntricular septum, aortic vestibule, arotic valve.</li> <li>How to access HEC digital library</li> <li>How to read relevant research article</li> </ul>	•	Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 <a href="https://youtu.be/uhSBFOTwzDQ">https://youtu.be/uhSBFOTwzDQ</a> <a href="https://www.ahajournals.org/doi/full/10.">https://www.ahajournals.org/doi/full/10.</a> <a href="https://www.ahajournals.org/doi/full/10.">1161/JAHA.122.028014</a>
Vasculature of heart	<ul> <li>Describe the origin of coronary arteries</li> <li>Identify course branches and distribution of right coronary arteries and left coronary artery,</li> <li>Discuss the concept of right and left dominance.</li> <li>Describe the venous drainage of heart.</li> <li>Discuss the related applied and clinical anatomy</li> <li>How to access HEC digital library</li> <li>How to read relevant research article</li> </ul>	•	Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 <a href="https://youtu.be/uhSBFOTwzDQ">https://youtu.be/uhSBFOTwzDQ</a> <a href="https://www.ahajournals.org/doi/full/10.">https://www.ahajournals.org/doi/full/10.</a> <a href="https://www.ahajournals.org/doi/full/10.">1161/JAHA.122.028475</a>
Innervation of heart	<ul> <li>Describe the formation of superficial and deep cardiac plexus.</li> <li>How to access HEC digital library</li> <li>How to read relevant research article</li> </ul>	•	Clinically Oriented Anatomy6th Edition, P no.129,135-137,144-149,153-159,171-172 <a href="https://youtu.be/uhSBFOTwzDQ">https://youtu.be/uhSBFOTwzDQ</a> <a href="https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028932">https://www.ahajournals.org/doi/full/10.1161/JAHA.122.028932</a>
Superior mediastinum (Trachea, Esophagus, Ascending Aorta)	<ul> <li>Enumerate the structure of superior mediastinum</li> <li>Describe great vessels in superior mediastinum</li> <li>How to access HEC digital library</li> <li>How to read relevant research article</li> </ul>	•	Clinically Oriented Anatomy6th Edition, P no.127-128,132,160-166,179 <a href="https://youtu.be/2POIIBe2xR4">https://youtu.be/2POIIBe2xR4</a> <a href="https://www.sciencedirect.com/science/article/abs/pii/S1472029906000336">https://www.sciencedirect.com/science/article/abs/pii/S1472029906000336</a>
Posterior mediastinum I	<ul> <li>Identify structures in posterior mediastinum</li> <li>Describe anatomy of structure in Posterior mediastinum</li> <li>Identify course, relations and branches of descending aorta.</li> <li>How to access HEC digital library</li> </ul>	•	Clinically Oriented Anatomy6th Editio n, P no. 128, 168-172, 179 https://youtu.be/2POIIBe2xR4 https://www.ncbi.nlm.nih.gov/pmc/articl

	How to read relevant research article	<u>es/PMC9792830/</u>
	• Describe formation, course and clinical importance of azygossystem of veins	Clinically Oriented Anatomy6th Edition,
	Describe formation and importance of hemiazygos vein	P no. 128, 168-172, 179
	How to access HEC digital library	https://youtu.be/2POIIBe2xR4
Surface anatomy / Radiology	How to read relevant research article	https://www.ncbi.nlm.nih.gov/pmc/articles/ PMC9792830/
	• Demonstrate surface projection and radiological aspects of heart, great vessels,	Clinically Oriented Anatomy6th Edition,
	trachea, oesphagus, postion of heart valves	P no.129,135-137,144-149,153-159,171-172
	How to access HEC digital library	• <a href="https://youtu.be/wqiK-8nZEqk">https://youtu.be/wqiK-8nZEqk</a>
	How to read relevant research article	https://pubs.rsna.org/doi/10.1148/ryct.220047

# **Physiology Self-Directed Learning (SDL)**

Topics Of SDL	Learning Objective	References	Learning Resources	Learning	Learning	Assessment Tool
				<b>Domains</b>	Strategy	
ON CAMPUS: Heart Sounds	Describe four heart sound and differences between 1st and 2nd heart sounds	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05, Cardiovascular Physiology (Chapter 30, Page 542)</li> <li>Textbook of Medical Physiology by</li> </ul>	<ol> <li>https://youtu.be/dBwr2         GZCmQM</li> <li>https://www.utmb.edu/ped         i         _ed/CoreV2/Cardiology/c</li> </ol>	C1/C2	SDL	MCQSEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)OSPE SDL Evaluation
		Guyton & Hall.14 <sup>th</sup> Edition.Section 04. (Chapter 23, Page 283)	a rdiologyV2/cardiologyV2 3.html			

Capillary circulation, Concept of vasomotion and starling forces	<ol> <li>Explain the details of types of starling forces.</li> <li>Expalin role of starling forces in different pathological conditions</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 05,(Chapter 31, Page 577)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Cardiovascular Physiology (Chapter 4,Page 170)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 02(Chapter 6,Page 119)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Section 04. (Chapter 16, Page 193)</li> </ul>	1. https://youtu.be/YNROPn Yy1tc 2. https://www.osmosis.org/ le arn/Microcirculation_and _ Starling_forces	1.C2 2.C2	SDL	MCQSEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)OSPE SDL Evaluation
Introduction to ECG & its clinical importance	<ul> <li>Enumerate and describe normal components of ECG</li> <li>Draw normal ECG</li> <li>Describe the method of recording ECG</li> <li>Describe the following. Bipolar limb leads.</li> </ul>	• Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 01,Immunity,Infection and Inflamma tion(Chapter 29, Page 522)	<ol> <li>https://youtu.be/SEFhbK8         ZCgk</li> <li>https://my.clevelandclinic         .o         rg/health/diagnostics/169         53         -electrocardiogram-ekg</li> </ol>	C1 C1 C1 C1 C1 C1 C1	SDL	MCQSEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)OSPE SDL Evaluation
	<ul> <li>Describe Einthovians law and Enthovian triangle.</li> <li>Describe Chest leads and Augmented unipolar limb leads</li> <li>Describe how to read normal ECG</li> <li>Describe the principles of vectorial analysis of ECG.</li> <li>Describe the vectorial analysis of normal ECG</li> </ul>	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 491)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. Chapter 09,Page 170)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03. (Chapter 11, Page 135)</li> </ul>		C1 C1 C1 C1 C1 C1 C1		

Cardiac cycle - I, Events of cardiac cycle and its graphical representation	<ul> <li>Describe the cardiac cycle in detail</li> <li>Enumerate and explain its events</li> <li>Explain the events of cardiac cycle</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03. (Chapter 9, Page 117)</li> </ul>	1.https://youtu.be/XbivIaF PoQI  1. https://www.sciencedirec t.c om/science/article/pii/S0 01 0027721003309  2. https://youtu.be/sLLLOa Z8 5Lk  3. https://teachmephysiolog y. com/cardiovascular- system/cardiac-cycle- 2/cardiac-cycle/  4. https://youtu.be/HNkwXZ S SssU	1. C1 2. C1/ C2 3. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Arrhythmias	<ul> <li>Describe the principles of vectorial analysis of ECG.</li> <li>Describe the vectorial analysis of normal ECG</li> <li>Define arrhythmia</li> <li>Describe abnormal sinus rhythms</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 526)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.(Chapter 09,Page 179,180- 189)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03. (Chapter 12, Page 143)((Chapter 13, Page 157)</li> </ul>	1.https://www.brainkart.co m/article/Principles-of- Vectorial-Analysis-of- Electrocardiograms 1924 1/ 2.https://youtu.be/6Lrptv e KYus 4. https://www.medicalnewst oday.com/articles/8887#d ef inition	1. C1 2. C1 3. C1 4. C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

Congestive cardiac failure	Explain the characteristics and functions of monocytes.  • Explain monocytemacrophge system; importance	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 01,Immunity,Infection and Inflamma tion(Chapter 03, Page 67)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 03, Blood(Chapter 21,Page 371)(Chapter 22,Page 387)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section</li> <li>(Chapter 34, Page 450-452)</li> </ul>	1.  https://www.sciencedirect.c om/topics/pharmacology- toxicology-and- pharmaceutical- science/mononuclear- phagocyte-system 2.https://bmcbiol.biomedce ntral.com/articles/10.118 6/ s12915-017-0392-4	1.C2 2.C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Long term regulation of blood pressure	Explain the role of kidneys in long term regulation of blood pressure	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 163)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 16,page 282)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. (Chapter 19, Page 229)</li> </ul>	1. <a href="https://youtu.be/5S9xEp">https://youtu.be/5S9xEp</a> Ad AgA 2. <a href="https://jps.biomedcentral.co">https://jps.biomedcentral.co</a> m/articles/10.1007/s1257 6- 012-0192-0 3. <a href="https://onlinelibrary.wiley.co">https://onlinelibrary.wiley.co</a> om/doi/10.1111/j.1440- 1681.2005.04205.x	C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Skeletal muscle blood flow,	Discuss the blood flow regulation in skeletal muscle at rest and during exercise.	Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 30, Page 549)	1.  https://www.sciencedirec t.c om/topics/medicine- and- dentistry/muscle- blood- flow	C2	SDL	MCQ SEQ VIVA VOCE

Cardiovascular changes during exercise		Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 178) Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.(Chapter 07,Page 148) Textbook of Medical Physiology by Guyton & Hall.14th Edition (Chapter 18, Page 226)(Chapter 21,Page 259)	2.  https://youtu.be/H6Fd8sf E2 eQ			MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
(OFF CAMPUS): Introduction to CVS	1. Describe scheme of circulation through the heart and body	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.Cardiovascular Physiology(Chapter 14,Page 469)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 117)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 02,(Chapter 05,Page 101)</li> </ul>	<ol> <li>https://youtu.be/28CYh gir BLA</li> <li>https://training.seer.cance r. gov/anatomy/cardiovascu la r/#:~:text=The%20cardio va scular%20system%20is% 2 Osometimes,arteries%2C % 20veins%2C%20and%20 ca pillaries.</li> </ol>	1.C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation

Classification of blood vessels & Biophysical considerations	1.Enumerate Classification of blood vessels. 2.Explain structure and functions of types of blood vessels	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05,Cardiovascular Physiology (Chapter 31, Page 567,571)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15,Page 513)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 119)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 04 (Chapter 15,Page 183)</li> </ul>	1. 2.	https://youtu.be/ar2_UPi Gz mU https://training.seer.cance r. gov/anatomy/cardiovascu la r/blood/classification.htm l	1.C1 2. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Regulation of blood flow	<ul> <li>1.Define and describe Resistance to Blood flow Describe regulation of Blood pressure and Poiseuilles law</li> <li>Describe factors related with Blood viscosity and its role in regulation</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05,Cardiovascular Physiology (Chapter 31, Page 575)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.Section 02(Chapter 5,Page 107)(Chapter 6,page 110)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th EditionSection 04. (Chapter 14, Page 173) (Chapter 17, Page 205)</li> </ul>	1. 2.	https://youtu.be/coc B- M3h9k0 https://journals.physiolog y. org/doi/full/10.1152/adva n. 00074.2010	1.C1 2.C1 3.C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

Introduction to ECG & its clinical importance	<ul> <li>Enumerate and describe normal components of ECG</li> <li>Draw normal ECG</li> <li>Describe the method of recording ECG</li> <li>Describe the following. Bipolar limb leads.</li> <li>Describe Einthovians law and Enthovian triangle.</li> <li>Describe Chest leads and Augmented unipolar limb leads</li> <li>Describe how to read normal ECG</li> <li>Describe the principles of vectorial analysis of ECG.</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 01,Immunity,Infection and Inflamma tion(Chapter 29, Page 522)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 491)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. Chapter 09,Page 170)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03. (Chapter 11, Page 135)</li> </ul>	1. https://youtu.be/SEFhbK 8Z Cgk 2. https://my.clevelandclinic .o rg/health/diagnostics/169 53 -electrocardiogram-ekg	C1 C1 C1 C1 C1 C1 C1 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
	<ul> <li>Describe the vectorial analysis of normal ECG</li> </ul>					
Vectorial analysis & arrhythmias	<ul> <li>Describe the principles of vectorial analysis of ECG.</li> <li>Describe the vectorial analysis of normal ECG</li> <li>Define arrhythmia</li> <li>Describe abnormal sinus rhythms</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 29, Page 526)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.(Chapter 09,Page 179,180- 189)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03. (Chapter 12, Page 143)((Chapter 13, Page 157)</li> </ul>	1.  https://www.brainkart.co m/ article/Principles-of- Vectorial-Analysis-of- Electrocardiograms_1924 1/ 3.  https://youtu.be/6Lrptve KY us 2. https://www.medicalnewst oday.com/articles/8887#d ef inition	C1 C1 C1 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

Ca c cycle	<ul> <li>Describe the cardiac cycle in detail</li> <li>Enumerate and explain its events</li> <li>Explain the events of cardiac cycle</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05,(Chapter 30, Page 537)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 14,Page 495-500)</li> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 154)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 03. (Chapter 9, Page 117)</li> </ul>	<ol> <li>https://youtu.be/XbivIaF Po QI</li> <li>https://www.sciencedirec t.c om/science/article/pii/S0 01 0027721003309</li> <li>https://youtu.be/sLLLOa Z8 5Lk</li> <li>https://teachmephysiolog y. com/cardiovascular- system/cardiac-cycle- 2/cardiac-cycle/</li> <li>https://youtu.be/HNkwX ZS SssU</li> </ol>	C1 C1/C2 C2 SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Splanchnic circulation, cutaneous circulation	<ul> <li>Describe the Physiologic anatomy of cerebral blood flow</li> <li>Describe the blood flow in normal state and local control of blood flow</li> </ul>	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.Cardiovascular Physiology (Chapter 4,Page 173)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 7,page 146)</li> </ul>	<ol> <li>https://youtu.be/hr6oGu W7 mVA</li> <li>https://www.sciencedirec t.c om/topics/medicine- and- dentistry/splanchnic-blood- flow</li> <li>https://www.ncbi.nlm.nih .g ov/pmc/articles/PMC299 92 90/</li> </ol>	1.C2 2. C2 SDL	MCQ SEQ VIVA VOCE  MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Regulation of blood pressure	<ul> <li>Explain short term regulation of blood pressure</li> <li>Explain central nervous system ischemic response &amp; cushing reaction</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.Section 05(Chapter 32, Page 585,590)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. (Chapter 15,Page 517,528)</li> </ul>	<ol> <li>https://youtu.be/HUf1Ltk Pj 1k</li> <li>https://www.sciencedirec t.c om/topics/nursing- and- health- professions/blood-</li> </ol>	1.C2 2. C2 SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Physiology by Linda S. Costanzo	pressure-regulation	SDL Evaluation
6th Edition.Cardiovascular	3. <a href="https://www.cliffsnotes.">https://www.cliffsnotes.</a>	
Physiology (Chapter 4,Page 163)	<u>co</u> <u>m/study-</u>	
Physiological Basis of Medical	guides/anatomy- and-	
Practice by Best & Taylor's.13th	physiology/the-	
Edition.(Chapter 18,Page 217)	<u>cardiovascular-</u>	
	system/control-of-	
	blood- pressure	

# **Biochemistry Self-Directed Learning (SDL)**

Topic	Learning Objectives	References
	At the end of lecture students should be able to	
	Protein chemistry	
Classifications and functions of carbohydrates	<ul> <li>Classify carbohydrates</li> <li>Explain different types of carbohydrates and their clinical significance</li> </ul>	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Edition Chapter No.7 pg 92,93</li> <li>Text Book of Harper 32 S T Edition chap No. 15 pg 141, 142,144,147</li> </ul>
Classifications and functions of lipids	<ul> <li>Define lipids</li> <li>Classify lipids</li> <li>Describe Biomedical significance of lipids</li> </ul>	Textbook of Harper 32 S T Edition Chapter No.21 pg 196
Fatty acids and simple lipids	<ul> <li>Classify fatty acids</li> <li>Describe physical and chemical properties of fatty acids</li> <li>Elaborate Structure and physical properties of Triglycerides</li> <li>Discuss Chemical properties of Triglycerides and their clinical significance</li> </ul>	Textbook of Lippincott 8 <sup>th</sup> Eidtion Chapter No.15 pg 196 -199
Classification and Chemical reactions of monosaccharide	<ul> <li>Classify monosaccharide</li> <li>Describe chemical properties of monosaccharide</li> <li>Interpret the clinical role of sorbitol, mannitol and cardiac glycosides</li> </ul>	Text Book of Harper 32 S T Edition chap No.15 pg 142, 145
Disaccharides	Describe Structure and functions of Individual sugars	Text book of Harper 32 S T Edition Chap No.15 pg 145, 156

Compound lipids	<ul> <li>Classify compound lipids</li> <li>Discuss structure and functions of compound lipids</li> <li>Interpret the clinical role of compound lipids</li> </ul>	Textbook of Lippincott 8 <sup>th</sup> Eidtion Chapter No. 21 pg 199-202
Prostaglandins	<ul> <li>Classify Prostaglandins</li> <li>Describe functions and clinical significance of Prostaglandins.</li> <li>Interpret the role of drugs in prostaglandin synthesis</li> </ul>	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Eidtion Chapter No. 17 pg 236</li> <li>Text Book of Lehninger 7<sup>th</sup> Edition chap No. 10.3 pg 375,376</li> </ul>
Heteropolysaccharides	<ul> <li>Explain Structure, physical and chemical properties of heteropolysaccharides and their biological importance.</li> <li>Apply the role of heteropolysaccharides in clinical cases</li> </ul>	<ul> <li>Textbook of Lippincott 8<sup>th</sup> Eidtion Chapter No. 14 pg 173-175</li> <li>Text Book of Harper 32 S T Edition Chap No.15 pg 147,148</li> </ul>

# **Histology Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives At The End Of Practical Students Should Be Able	Learning Domain	Teaching Strategy	Assessment Tool
	To	Domain	Strategy	1001
	• identify characteristic histological features of tunica intima, tunica media	P1		
	and tunica adventitia of elastic arteries under microscope			
	• Illustrate histological structure of elastic artery	C1	Skill lab	OSPE
Elastic Arteries	Write two points of identification	C1		
	To read relevant research article	C3		
	• identify characteristic histological features of tunios intime tunios madia	P1		
	• identify characteristic histological features of tunica intima, tunica media and tunica adventitia of muscular and small sized arteries arteries under	P1		
	microscope			
Muscular Arteries	Illustrate histological structure of Muscular and small sized artery	C1	Skill lab	OSPE
Small Arteries	Write two points of identification	C1	]	
	Differentiate between three types of arteries on histology slides	C1		
	To read relevant research article	C3		
	• Identify characteristic histological features of tunica intima, tunica media	P1		
	and tunica adventitia of large vein under microscope			
Large Vein	Illustrate histological structure of large vein	C1	Skill lab	OSPE

	Write two points of identification	C1		
	To read relevant research article	C3		
	• Identify characteristic histological features of tunica intima, tunica media and tunica adventitia of medium and small sized vein under microscope	P1		
Medium and small	Illustrate histological structure of medium and small sized vein			
sized vein	• Write two points of identification Differentiate between three types of veins on histology slides	C1	Skill lab	OSPE
	To read relevant research article	C3		
	Classify capillaries on the basis of histological structure and function	C1		
Capillaries	• Enlist sites of continuous, fenestrated and sinusoidal capillaries	C1	Skill lab	OSPE
	• Elaborate characteristic histological features of tunica intima, tunica media and tunica adventitia of capillaries	C1		
	Draw and label histological structure of each type of capillaries	C1		
	Write two points of identification	C1		
	To read relevant research article	C3		

# Physiology Practicals Skill Laboratory (SKL)

Topic	Learning Objectives At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
	• Define B. P	C1		
Blood Pressure at	Detail study of apparatus	P		OSPE
rest and during	How to use apparatus	P	Skill Lab	Viva
exercise	Indentify changes in blood pressure during exercise	P		
	Importance of radial pulse & JVP	C1		
Examination of	Procedure	P	Skill Lab	OSPE
arterial pulse and JVP	Various characteristic of pulse	P, C2		Viva
	Detail study of ECG leads	C2		
	How to apply leads	P		OSPE

ECG	Recording	P	Skill Lab	Viva
	Discussion about normal ECG	P, C2		
	Clinical importance	C2		
	• Inspection	P		
Clinical examination	• Palpation	P	Skill Lab	OSPE
of chest (Heart	<ul> <li>Auscultation of all areas of heart</li> </ul>	P		Viva
sounds)	• Locate apex beat	P		
	• Steps of CPR	P		OSPE
CPR	Importance of CPR in daily life	C2, P	Skill Lab	Viva
	Steps of Examination	P		OSPE
Triple Response	Clinical Importance	C2	Skill Lab	Viva

# **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Practical Students Should Be	Domain	Strategy	Tool
	Able To			
Carbohydrates	Perform Tests for the detection of carbohydrates and reducing	P	Skill lab	OSPE
	sugars(Molisch's test)			
	Perform Tests for the detection of carbohydrates and reducing	P		
Carbohydrates	sugars(Benedict's tests)		Skill lab	OSPE
	Perform Tests for differentiation between Mono and disaccharides; Aldo and	P		
Carbohydrates	ketosugars		Skill lab	OSPE
	(Barford's and Salvinoff's test)			
Carbohydrates	Perform Iodine test	P	Skill lab	OSPE

## **Basic and Clinical Sciences (Vertical Integration)**

#### Content

- Case Base Learning (CBLs)
- Problem Base Learning (PBls)
- Vertical Integration LGIS

# **Case Based Learning Objectives (CBL)**

Subjects	Topics	At the end of the session the student should be able to	Learning
			<b>Domains</b>
	Cardiac Temponade	Apply basic knowledge of subject to study clinical case.	C3
Anatomy	Coarctation of Aorta	Apply basic knowledge of subject to study clinical case.	C3
	Pitting edema	Apply basic knowledge of subject to study clinical case	C3
Physiology	Palpitations / Tachycardia	Apply basic knowledge of subject to study clinical case	C3
Biochemistry	Atherosclerosis	Apply basic knowledge of subject to study clinical case.	С3
Diochemistry	Heparin/dextran	Apply basic knowledge of subject to study clinical case.	C3

# **Vertical Integration LGIS**

## **Community Medicine**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of lecture students should be able to	Domain	Strategy	Tool
Risk factors of coronary vascular	• Students should be able to identify and explain the major risk factors for coronary vascular disease, including lifestyleand genetic factors, and how they contribute to the development of the condition.	C1, C2	LGIS	MCQ
disease	• Students should be able to describe the common symptoms of coronary vascular disease and outline effective prevention strategies, including lifestyle modifications and medical interventions.	C2, C3		

#### **Pediatrics**

Topic	At the End of Lecture Students Should Be Able	Learning	Teaching	Assessment
	To	Domain	Strategy	Tool
Murmurs	Differentiate between cyanotic and acyanotic congenital heart diseases on the basis of clinical features	C2	LGIS	MCQs

## Pharmacology

Topic	Learning Objectives At the end of lecture students should be able		Teaching Strategy	Assessment Tool
	to			
Clinical Pharmacology of Anti hypertensive	• Students should be able to explain the mechanisms of action of different classes of antihypertensive drugs, such as ACE inhibitors, beta-blockers, and calcium channel blockers, and how they lower blood pressure.	C2	LGIS	MCQ
drugs	• Students should be able to assess the therapeutic uses of various antihypertensive drugs and identify common side effects and contraindications associated with each class of medication.	C2		

## Pathology

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
	Define edema	C1		
Edema	Classify edema	C2	LGIS	MCQ
	• Discuss pathophysiology of edema with clinical correlation	C2		

### Medicine

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
	Define Hypertension	C1	Strategy	1001
	Discuss various causes and grades.	C2		
	Explain the clinical presentation.	C2		
Hypertension	Compare between primary and secondary hypertension.	C2	LGIS	MCQs
	• Enlist the lab investigations to be done for hypertension.	C2		
	Discuss the treatment plan of hypertension.	C2		
	Discuss ACS and its various causes.	C2		
Overview of acute	• Illustrate the clinical presentation of ACS.	C2	]	
coronary syndrome	• Explain the workshop to be done in E.R for ACS	C2	LGIS	MCQs
	<ul> <li>Discuss the treatment of ACS</li> </ul>	C2		
Management of	<ul> <li>Discuss the stepwise management of heart failure.</li> </ul>	C2		
heart failure			LGIS	MCQs
Management of	<ul> <li>Discuss the management according to various types of shock.</li> </ul>	C2	LGIS	
shock				MCQs

## **Obstetrics & Gynecology**

Topic	At The End Of Lecture Students Should Be Able	Learning	Teaching	Assessment
	To	Domain	Strategy	Tool
	<ul> <li>Understand physiological changes in cardiovascular system during pregnancy (incl. plasma volume, stroke volume, cardiac output, blood</li> </ul>	C2		
Cardiovascular	pressure)			ļ
changes in	<ul> <li>Know physiological versus pathological symptoms related to CVS</li> </ul>	C2		
pregnancy,	• Briefly describe clinical presentations of common cardiac diseases during	C2	LGIS	MCQs
common cardiac	pregnancy (rheumatic heart disease, cardiomyopathy, cardiac failure)			
diseases	<ul> <li>The effect of cardiac disease on fetus and the mother</li> </ul>	C2		
	<ul> <li>Define gestational hypertension</li> </ul>	C1		
Hypertensive disorders in	<ul> <li>Describe the spectrum of hypertensive disordersduring pregnancy with proper definitions</li> </ul>	C2	LGIS	MCQs
	Comprehend pathophysiology of these disorders	C2	1	

Know clinical presentation of hypertensive disorders	C2	
<ul> <li>Justify relevant laboratory investigations</li> </ul>	C2	
Understand principles of management	C2	
Enlist maternal and fetal complications	C2	

### Eye

Topic	At the End of Lecture Students Should Be Able To	Learning	Teaching	Assessment
			Strategy	Tool
	Define hypertensive retinopathy	C1		
Retinal changes in	<ul> <li>Describe stages of hypertensive retinopathy</li> </ul>	C2	LGIS	MCQs
hypertension	• Explain pathophysiology of hypertensive retinopathy	C2	CBL	

## Radiology

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Chest radiograph with	Interpret normal x-rays of Chest	C2		
perspective of cardiovascular system	Discuss radiological features of different structures in chest	C2	LGIS	MCQs

## **Spiral Courses**

### Content

- Longitudinal Themes
  - $\circ \quad \textbf{The Holy Quran Translation}$
  - o Family Medicine
  - o Behavioral Sciences & Biomedical Ethics
  - o Early Clinical Exposure (ECE)

### **Behavioral Sciences & Biomedical Ethics**

Topic	At the End of Lecture Students Should Be Able		Teaching	Assessment
	To	Domain	Strategy	Tool
Sociology & Health	• The student should be able to understand sociology & health, social groups, social classes & child rearing practice	C1, C2	LGIS	MCQS
Anthropology & Health	• The student should be able to understand culture & its influence on health care	C1, C2	LGIS	MCQS

## **Family Medicine**

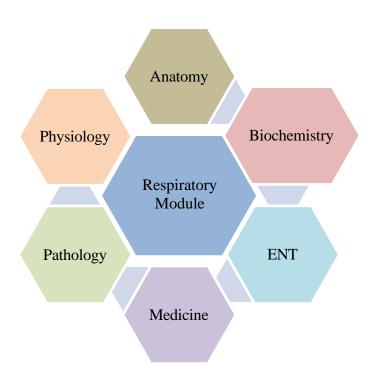
Topic	At the End of Lecture Students	Learning	Teaching	Assessment
	ShouldBe Able To	Domain	Strategy	Tool
	Describe chest pain	C1		
Approach to a patient	Discuss various causes	C2		
with chest pain	Explain the clinical presentation.	C2	LGIS	MCQs
	Enlist the lab investigations	C2		
	Decision for referral of patient	C2		



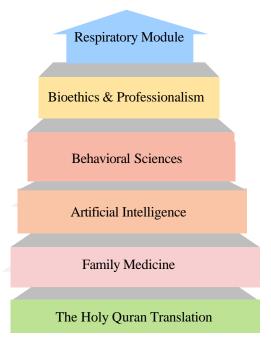
# **Respiratory Module**



### **Integration of Disciplines in Respiratory Module**



## **Spiral / General Education Cluster Courses**



## **Discipline Wise Details of Modular Contents**

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy						
	• Anatomy	•	Embryology of     Respiratory System	Histology of Upper & Lower  Respiratory System	Gross Anatomy of Upper & Lower Respiratory System						
	Biochemistry		• pH, Electron transport chain, Oxidative phosphorylation, Water soluble vitamins riboflavin, biotin, pyridoxine, pantothenic acid, Normal acid base regulation								
	<ul> <li>Physiology</li> </ul>	<ul><li>Pulmonary C Respiratory N</li><li>Regulation of Useful Metho</li></ul>	Pulmonary Ventilation, Pulmonary Volumes and Capacities, Alveolar Ventilation, Functions of the Respiratory Passageways Pulmonary Circulation, Pulmonary Edema, Physical Principles of Gas Exchange; Diffusion of Oxygen and Carbon Dioxide Through Respiratory Membrane Transport of Oxygen and Carbon Dioxide in Blood and Tissue Fluids Regulation of Respiration Useful Methods for Studying Respiratory Abnormalities, Respiratory Insufficiency, Hypoxia & Oxygen Therapy, Hypercapnia & Artificial Respiration Respiratory changes during Exercise, Aviation, Space & Deep-Sea Diving Physiology								
		Spiral Courses									
III	<ul> <li>The Holy Quran Translation</li> </ul>	Immaniat- V & VI     Ibaadat-V									
	<ul><li>Artificial Intelligence</li></ul>	Artificial Intelligence basic concepts									
	Family Medicine	Approach to a	a patient with cough hemoptysis & show	rtness of breath							
	<ul> <li>Climate Change &amp;</li> </ul>	Effects of Cli	mate Changes on Body Systems (IHD,	Skin Diseases & Heat Stroke)							
	Health		mate Changes on Respiratory System (	Asthma, COPD, Allergies & Cance	ers)						
		Greenhouse effect									
		Global warming and climate change									
	<ul> <li>Bioethics         Professionalism &amp;         Behavioral Sciences     </li> </ul>	Crises intervention and disaster Conflict resolution and empathy									
	Vertical Integration										
	Medicine	• Tuberculosis									
	<ul> <li>Pathology</li> </ul>	Clinical disorders of Respiration									
	• ENT	Foreign body nose & ear &Tonsillitis									
			<del>-</del>	Exposure (ECE)							
	Medicine	• Dyspnea	Observe/see patients								

	Cyanosis & see Asthma case COPD cases
	Tuberculosis cases with fibrosis of lungs
• Surgery	See cases of Flail chest & Pneumothorax
	Chest intubation
Radiology	Radiology of chest
	Chest X-ray at different level with reference to Anatomy and Pathologies
	Clinical Themes
Obstructive Lung D	iseases
Pneumonia	

### **Respiratory Module Team**

Module Name : Respiratory Module

Duration of module : 04 Weeks Coordinator : Dr. Rahat

13. Focal Person Quran Translation

14. Focal Person Family Medicine

Lectures

Co-coordinator : Dr. Qurat ul Ain Reviewed by : Module Committee

Dr. Uzma Zafar

Dr. Sadia Khan

	Module Comr	nittee		M	odule Task Force Team
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Rahat (Senior Demonstrator of Physiology)
2.	Chairperson Anatomy & Dean	Prof. Dr. Ayesha Yousaf	2.	DME Focal Person	Dr. Farzana Fatima
	Basic Sciences				
3.	Director DME	Prof. Dr. Ifra Saeed	3.	Co-coordinator	Dr. Qurat ul Ain (Senior Demonstrator of Anatomy)
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Almas Ejaz (Demonstrator Biochemistry)
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Fareed Ullah Khan (Senior Demonstrator Physiology)
6.	Focal Person Anatomy First Year	Asso. Prof. Dr. Mohtashim Hina	na		
	MBBS				
7.	Focal Person Physiology	Dr. Sidra Hamid		DM	IE Implementation Team
			1.	Director DME	Prof. Dr. Ifra Saeed
8.	Focal Person Biochemistry	Dr. Aneela Jamil	2.	Assistant Director DME	Dr. Farzana Fatima
9.	Focal Person Pharmacology	Dr. Zunera Hakim	3.	Implementation Incharge 1st & 2 <sup>nd</sup>	Prof. Dr. Ifra Saeed
				Year MBBS	Dr. Farzana Fatima
					Dr. Saira Aijaz
10.	Focal Person Pathology	Dr. Asiya Niazi	4.	Editor	Muhammad Arslan Aslam
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom			

#### **Module VI - Respiratory Module**

**Rationale**: A respiratory system's function is to allow gas exchange. The space between the alveoli and the capillaries, the anatomy or structure of the exchange system, and the precise physiological uses of the exchanged gases vary depending on the organism. In humans' respiratory system include airways, lungs, and the respiratory muscles. Molecules of oxygen and carbon dioxide that are passively exchanged, by diffusion, between the gaseous external environment and the blood. This exchange process occurs in the alveolar region of the lungs.

In this present module has been designed to unfold structural organization function congenital anomalies and diseases of respiration. It explains the anatomy, control, gases exchange, reflexes of respiratory system. It also helps to include the radiological examination of the respiratory system.

#### **Module Outcomes**

At the end of this module the student should be able to:

#### **Knowledge:**

- 1. Integrate the basic science knowledge with clinical sciences in order to describe the pathogenesis, clinical presentations of common respiratory disorders, e.g. COPD
- 2. Use technology based medical education including
  - Artificial Intelligence.
- 3. Appreciate concepts & importance of Family Medicine

**Biomedical Ethics** 

Research.

#### **Skill:**

- 1. Describe the gross anatomy of mediastinum along with clear understanding of structures present in it.
- 2. Correlate between histological structure of respiratory membrane and its role in diffusion of gases.

#### **Attitude:**

1. Demonstrate a professional attitude, team building spirit and good communication skills.

### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



## Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

## **Anatomy Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of lecture students should be able to	Domain	Strategy	Tool
	• Explain division of the respiratory system	C2		
	• Describe different functions of respiratory system.	C2		
Respiratory system 1	Describe details of respiratory epithelium	C2		1.600
	Discuss microscopic structure of vestibule	C2	I CIG	MCQ
(Histology)	• Describe structural specialization in mucosa of nasal cavity proper	C2	LGIS	SAQ VIVA
	Appreciate differences between respiratory mucosa and olfactory mucosa	C1		VIVA
	Describe the features of olfactory mucosa	C2		
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Describe microscopic structure of paranasal sinuses	C2		
	• Describe general histological organization of respiratory system	C2		
	Appreciate different histological layers of nasopharynx	C1		MCQ
Respiratory system II	Describe histological structure of laryngeal cartilages	C2	LGIS	SAQ
(Histology)	• Discuss components of tracheal wall	C2		VIVA
	Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	• Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Describe division of bronchial tree	C2		
Respiratory System III	• Discuss microscopic structure of extra and intra pulmonary bronchi	C2		
(Histology)	Describe histological structure of bronchioles	C2	1 616	MCQ
	Appreciate differences between bronchi and bronchioles Discuss microscopic structure of terminal bronchioles	C1	LGIS	SAQ VIVA

	Appreciate the significance of Clara cells with their functions	C2		
	Discuss other cells present in terminal bronchioles	C2	1	
	Describe the microscopic structure of respiratory bronchioles	C2		
	Describe differences between respiratory and terminal	C2		
	bronchioles Describe characteristics of alveolar ducts			
	Correlate the clinical conditions	C3	1	
	Understand the preventive and curative health care measures	C3	1	
	Practice the principles of Bioethics	C3	1	
	Apply strategic use of AI in health care	C3	1	
	Read a research article	C3	1	
	Describe histological structure of alveolar ducts and their	C2		
	functions			
	Identify type 1 and type II alveolar cells	C1	1	MCQ SAQ
Respiratory System IV	Describe histological structure of interalveolar septum	C2	LGIS	VIVA
	Discuss role of alveolar macrophages	C2	1	
(Histology)	Describe Blood – Air barrier in detail	C2		
	Discuss histology of pleura in detail	C2	1	
	Correlate the clinical conditions	C3	1	
	Understand the preventive and curative health care measures	C3	1	
	Practice the principles of Bioethics	C3	1	
	Apply strategic use of AI in health care	C3	1	
	Read a research article	C3	1	
	Describe role of pharyngeal arches in development of nose	C2		
Development of Nose	Describe development of nose and paranasal sinuses	C2	1	
and Paranasal sinuses	Describe the Congenital anomalies of nose and paranasal sinuses	C2	1	MCQ SAQ
and I aranasar sinases	Correlate the clinical conditions	C3	LGIS	VIVA
	Understand the preventive and curative health care measures	C3	1	
	Practice the principles of Bioethics	C3	1	
	Apply strategic use of AI in health care	C3	1	
	Read a research article	C3		
	Describe formation of respiratory primordium	C2		
Development of Larynx		C2	_	
& Trachea	Discuss formation of laryngotracheal diverticulum	C2	1	MCQ SAQ
& Haciica	Describe formation of trachea esophageal septum and its	C2	LGIS	VIVA
	importance			

	Describe Congenital defects associated with development of	C3		
	Trachea			
	Describe formation and division of respiratory buds	C2		
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Discuss development of bronchi and bronchopulmonary	C2		
	segments			
	Describe development of pleural cavities	C2		MCQ SAQ
	• Discuss process of maturation of lungs	C2	LGIS	VIVA
	• Enlist different stages of lung maturation	C1		
D 1 CI	• Explain the production and significance of Surfactant	C2		
Development of Lungs	• Describe role of fetal breathing movements in maturation of	C2		
	lungs			
	Discuss postnatal development of lungs	C2		
	Describe congenital anomalies associated with lungs	C3		
	Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Describe the development of diaphragm	C2		
	• Elaborate formation of septum transversum and its role in	C2		
Development of	development of diaphragm			MCQ SAQ
Diaphragm	Discuss congenital defects associated with diaphragm	C3	LGIS	VIVA
Diapinagin	Correlate the clinical conditions	C3		
	• Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		

## **Physiology Large Group Interactive Session (LGIS)**

Topics	Learning Objectives	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Mechanics of pulmonary ventilation, Lung compliance	<ul> <li>Enumerate muscles of inspiration and expiration and</li> <li>Describe mechanics of pulmonary ventilation</li> <li>Describe surfactant, surface tension and collapse of alveoli</li> <li>Define compliance.</li> <li>Draw compliance diagram of lungs.</li> <li>Explain relationship of surface tension, radius of alveoli, elastic forces of lungs with compliance</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Section 06, Respiratory Physiology (Chapter 34, Page 621,629)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Mechanics of Breathing (Chapter 17,Page 569)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 189,197)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 05,(Chapter 36,Page 581),(Chapter 40,Page 629)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 38, Page 491,493)</li> </ul>	1. https://www.ncbi. nlm.nih.gov/book s/NBK538324/ 2. https://youtu.be/B TwgmMfqOW4	C1 C1 C1 C1 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Pulmonary circulation & Pulmonary capillary dynamics. Physical principles of gas exchange & diffusion through respiratory membrane	<ul> <li>Discuss the role of alveoli and pleural space in respiration and pressure changes during respiration</li> <li>Enlist non-respiratory and respiratory functions of respiration</li> <li>Define and explain the concept of respiratory membrane.</li> <li>Define and draw respiratory unit</li> <li>Draw a diagram showing the exchange of gases through the respiratory membrane</li> <li>Enlist four factors affecting the rate of gas diffusion through the respiratory membrane</li> <li>Define diffusing capacity of respiratory membrane.</li> <li>Describe the diffusing capacity for oxygen.</li> <li>Describe the diffusing capacity for carbon dioxide.</li> <li>Describe the changes in diffusing capacity of oxygen and carbon dioxide during exercise</li> <li>Compare the diffusing capacities of oxygen and carbon dioxide</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 626,633,635)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 574)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 209)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 37,Page 592)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 39, Page 503) (Chapter 40, Page</li> <li>511,515)</li> </ul>	1. https://youtu.be/aJPwUnZtycQ 2. https://youtu.be/zv1fDFn8BaM 3. https://pressbooks-dev.oer.hawaii.edu/biology/chapter/gas-exchange-across-respiratory-surfaces/ 4. https://www.sciencedirect.com/science/article/pii/S2666496822000194.	C2 C1 C1 C1 C1 C1 C1 C1 C1 C2 C2	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
--	---	--	--	--	--

measured by spirometer  • 38, Page 495)	Pulmonary volumes, capacities & functions of respiratory tract	<ul> <li>Define lung volumes and capacities.</li> <li>Define the four pulmonary volumes and capacities.</li> <li>Enlist normal values of all the lung volumes and capacities</li> <li>Draw a graph representing all the lung volumes and capacities.</li> <li>Describe how lung volumes and capacities can be measured with spirometer.</li> <li>Enlist the lung volumes and capacities which can't be measured by spirometer</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 628)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 578)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 191)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 38, Page 495)</li> </ul>	1. https://youtu.be/9 VdHhD1vcDU  2. https://teachmeph ysiology.com/res piratory- system/ventilation /lung-volumes/	C1 C1 C1 C1 C1	LGIS	M MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
---	---	--	---	---	----------------------------	------	--

Transport of oxygen	Describe in detail the transport of oxygen from lungs to tissues	<ul> <li>and Transport (Chapter 18, Page 599)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 210,213,216)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 38,Page 603)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter</li> </ul>	https://teachmephysi     ology.com/respirator     y-system/gas-     exchange/oxygen-     transport/     https://youtu.be/HU6 LQldvog	C1 LGIS	MCQ SEQ VIVA VOCE MCQ (LMS  based Assessment, MST based Assessment) OSPE
		Guyton & Hall.14 <sup>th</sup> Edition. (Chapter  • 41, Page 521)			

Ventilation perfusion ratio	Define And Explain importance.     Draw ventilation perfusion diagram     Explain the concept of physiologic shunt and dead space	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 34, Page 636)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Mechanics of Breathing (Chapter 17, Page 587)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 194,225,229)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 39,Page 612)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 38, Page 497)</li> </ul>	https://youtu.be/UKs     OLb5XWa0      https://teachmephysi     ology.com/respirator     y-system/gas-     exchange/ventilation     -perfusion/	C1/C2 C1 LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE,
Oxygen hemoglobin dissociation curve	Describe the role of hemoglobin in oxygen transport. Draw oxy-hemoglobin dissociation curve. Enlist and explain factors which shift the curve towards right and left.  • Briefly explain the transport of oxygen in plasma	<ul> <li>Ganong's Review of Medical         Physiology.25<sup>TH</sup> Edition.Section 06,         Respiratory Physiology (Chapter 35,         Page 639-641)</li> <li>Human Physiology by Dee Unglaub         Silver thorn. 8<sup>TH</sup> Edition.Gas Exchange         and Transport (Chapter 18, Page 608)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup>         Edition. Respiratory Physiology         (Chapter 5,Page 218)</li> <li>Textbook of Medical Physiology by         Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter         41, Page 524)</li> </ul>	1. https://www.science direct.com/topics/nur sing-and-health- professions/oxygen- dissociation-curve https://youtu.be/MU Kkv1rbOIM	C1 C1 C1 LGIS C2	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Lung function test	Describe all the non-invasive & invasive tests to assess the pulmonary functions	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Mechanics of Breathing (Chapter 17, Page 592)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter</li> <li>44, Page 553)</li> </ul>	<ol> <li>https://www.webmd. com/lung/types-of- lung-function-tests</li> <li>https://youtu.be/6dH VhEjzj64</li> </ol>	C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Transport of CO <sub>2</sub>	Enumerate and explain the various transport forms of carbondioxide in blood. Also state percentages of all these forms  Explain the carbondioxide dissociation curve  Define respiratory exchange ratio.  Describe haldanes effect ,bohr effect and chloride shift	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 35, Page 641)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 223)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 05,(Chapter 38,Page 606)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter</li> <li>41, Page 528)</li> </ul>	https://courses.lumen     learning.com/wm-     biology2/chapter/tra     nsport-of-carbon-     dioxide-in-the-blood/     https://youtu.be/Vgp     NSdWvrno	C1 C2 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Respiratory abnormalities (COPD, Tuberculosis, Pneumonia, Atelectasis)	Explain the physiologic peculiarities of chronic pulmonary emphysema, pneumonia, ateiectasis, asthma and tuberculosis	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 36, Page 664)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 43, Page 541)</li> </ul>	<ol> <li>https://www.phys io- pedia.com/Respir atory_Disorders</li> <li>https://youtu.be/S rKfsCdeqWc</li> <li>https://youtu.be/h Op7bs5xdgQ</li> </ol>	C2	LGIS	MCQ SEQ  VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Nervous regulation of respiration	<ul> <li>Describe term respiratory center.</li> <li>Enumerate the various respiratory centers.</li> <li>Give the anatomical location of respiratory centers</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 36, Page 655)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Gas Exchange and Transport (Chapter 18, Page 614)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 231)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05(Chapter 41,Page 646)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 42, Page 531)</li> </ul>	<ol> <li>https://youtu.be/ KNAKKNbq20</li> <li>https://teachmeph ysiology.com/res piratory- system/regulation /neural-control- ventilation/</li> </ol>	C1 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Hypoxia, hypercapnia, cyanosis	<ul> <li>Define hypoxia and hypercapnia. Enumerate and explain its various types.</li> <li>Enumerate the roles of oxygen therapy in different types of hypoxia</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 35, Page 646,650)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Respiratory Physiology (Chapter 5,Page 239)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,,(Chapter 41,Page 653) (Chapter 42,Page 662)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 43, Page 546)</li> </ul>	<ol> <li>https://youtu.be/w tnqgs3Fg</li> <li>https://www.very wellhealth.com/h ypoxia-types- symptoms-and- causes-2248929</li> </ol>	C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Chemical regulation of respiration & exercise changes	<ul> <li>Describe in detail the role of respiratory centers in the regulation of respiration.</li> <li>Explain chemical control of respiration in detail</li> <li>Describe changes in respiration during exercise. Enumerate and briefly explain factors which affect respiration.</li> <li>Describe briefly the mechanism of periodic breathing and sleep apnea</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 36, Page 657,664)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 41,Page 649)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 42, Page 533,536)</li> </ul>	1. <a href="https://youtu.be/g">https://youtu.be/g</a> <a href="Ref Ref 2007">R_RLgo9Vn0</a> 2. <a href="https://journals.p">https://journals.p</a> <a href="https://journals.p">h</a> <a href="ysiology.org/doi/a">ysiology.org/doi/a</a> <a href="mailto:a">a</a> <a href="bs/10.1152/physr">bs/10.1152/physr</a>	C1 C2 C1 C1 LGIS	MCQ SEQ VIVA VOCE MCQ (LMS  based Assessment, MST based Assessment) OSPE
Space physiology	<ul> <li>Define and explain the process of acclimatization to low oxygen tension</li> <li>Describe acute and chronic mountain sickness</li> <li>Describe the effects of acceleratory forces on body in aviation and space physiology</li> </ul>	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.(Chapter 42,Page 659,663)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 44, Page 553)</li> </ul>	https://youtu.be/N     FfHh rQZJE      https://www.phys     oc.org/careers/res     earch/space-     physiology/	C1 C1 C1 LGIS	MCQ SEQ VIVA VOCE MCQ (LMS  based Assessment, MST based Assessment) OSPE
Miscellaneous factors affecting respiration (concept of voluntary control of respiration, lung J receptor, brain edema, anesthesia, chyne stokes breathing, sleep apnea)	<ul> <li>Describe in detail the role of respiratory centers in the regulation of respiration.</li> <li>Explain chemical control of respiration in detail</li> <li>Describe changes in respiration during exercise. Enumerate and briefly explain factors which affect respiration.</li> <li>Describe briefly the mechanism of periodic breathing and sleep apnea</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 36, Page 662)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 41,Page 656)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 42, Page 538)</li> </ul>	https://www.physoc.     org/careers/research/     space-physiology/      https://www.brainka     r     t.com/article/Factors     Affecting-     Respiration 16533/	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS  based Assessment, MST based Assessment) OSPE

High altitude physiology	<ul> <li>Describe the effects of low oxygen pressure on body</li> <li>Enumerate the acute effects of hypoxia on body</li> <li>Define and explain the process of acclimatization to low oxygen tension</li> <li>Describe acute and chronic mountain sickness Describe the effects of acceleratory forces on body in aviation and space physiology</li> </ul>	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 35, Page 648)  • Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition.Respiratory Physiology (Chapter 5,Page 237)  • Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition.Section 05,(Chapter 42,Page 659)  • Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. (Chapter  • 44, Page 553,556,559)	1. <a href="https://youtu.be/6">https://youtu.be/6</a> <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2151">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2151</a> <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2151">873/</a>	C1 C1 LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
Deep sea physiology	<ul> <li>Discuss Effect of high partial pressure of individual gasses on the body</li> <li>Discuss Oxygen toxicity at high pressure Carbon dioxide toxicity at high pressure Explain in detail the process of decompression in deep sea divers</li> </ul>	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. (Chapter 42, page 665)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 44, Page 553)</li> </ul>	1. https://medicoapp s.org/m- physiology-of- deep-sea-diving/ 2. https://youtu.be/e eNMkPam9aU	C2 C2 LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment)  OSPE

## **Biochemistry Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of lecture students should be able to	Domain	Strategy	Tool
	<ul> <li>Define of pH and pKa</li> </ul>	C1		MCQs
PH And PKA	<ul> <li>Elaborate Henderson Hasselbalch equation.</li> </ul>	C2	LGIS	SAQs
	Describe Measurement of pH by equation.	C2		Viva
	• Define buffers.	C1		MCQs
Body buffers	• Discuss Mechanism of various buffers in maintenance of blood pH.	C2	LGIS	SAQs Viva
	• Describe Components/ complexes of electron transport chain.	C2		MCQs
Electron transport	• Enlist Enzymes and Co-enzymes of each component.	C1	LGIS	SAQs
chain	• Enlist Inhibitors of these complexes.	C1		Viva
	• Discuss various mechanisms of energy generation in the body.	C2		MCQs
Mechanisms of	Discuss Oxidative phosphorylation.	C2	LGIS	SAQs
energy generation in the body.	Describe uncouplers.	C2		Viva
	• Define the terms:	C1		MCQs
Energy change.	<ul> <li>Free energy change.</li> </ul>		LGIS	SAQs
	<ul> <li>Standard free energy.</li> </ul>			Viva
	<ul> <li>Describe various sources of electrons.</li> </ul>	C2		
	Define Vitamins	C1		MCQs
	<ul> <li>Discuss the distribution, daily requirement and deficiency of</li> </ul>	C2	LGIS	SAQs
Vitamins	vitamins	C2		Viva
	• Clinical indication of vitamins			
	<ul> <li>Define xenobiotics</li> </ul>	C1		MCQs
Xenobiotics	• Discuss its metabolism and its role in environment	C2	LGIS	SAQs
				Viva

## **Anatomy Small Group Discussion (SGDs)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of lecture students should be able to	Domain	Strategy	Tool
	Describe anatomy of nasal cavity	C2		
	• Describe the blood supply and the site of anastomosis in the nose.	C2		
	• Discuss the nerve supply of nose	C2		1.600
Nose &	Discuss the applied and the related clinical.	C3	Clail I ala	MCQ
Paranasal Sinuses	Define and enumerate para nasal sinuses.	C1	Skill Lab	SAQ Viva
Silluses	• Discuss the shape, location and their point of openings.	C2		OSPE
	Correlate the clinical conditions	C3		OSLE
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	• Enumerate the components of larynx	C1		
	Describe paired and unpaired cartilages of larynx Describe Intrinsic and extrinsic      page 1 and 1 an	C2		
	muscles of larynx (origin, insertion nerve supply and action).	- C2		MCQ
Larynx &	<ul> <li>Describe Intrinsic and extrinsic membrane (attachments and structure piercing the membranes).</li> </ul>	C2		SAQ
Trachea	• Discuss the movements of vocal cords and their effects on the voice and respiration.	C2	Skill Lab	Viva
	• Discuss the blood supply and nerve supply of larynx.	C2		OSPE
	Discuss the applied and the related clinical.	C3		
	<ul> <li>Describe the level of commencement of trachea, its termination and the tracheal cartilages.</li> </ul>	C2		
	State the level of division of trachea	C1		
	Describe in detail the nerve supply and blood supply of trachea.	C2	]	
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		

	Read a research article	C3		
	Enumerate the bones of the thorax.	C1		MCQ SAQ
	Describe and classify the typical ribs (side determination, features, attachments, relations, types and ossification.	C2		
Overview of	Correlate the clinical conditions	C3		
Thoracic wall	Understand the preventive and curative health care measures	C3	Skill Lab	Viva OSPE
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
Skeleton of	• Describe and classify the atypical ribs (side determination, features, attachments, relations, types and ossification.	C2		
thoracic wall (Ribs)		C2		
	Discuss costal cartilages and their attachments.	C2		MCQ SAQ Viva OSPE
	Correlate the clinical conditions	C3	Skill Lab	
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Identify different parts of sternum.	C1		
	Describe the bony features, attachments ossification of sternum	C2		
Skeleton of	Correlate the clinical conditions	C3		MCQ
thoracic wall	Understand the preventive and curative health care measures	C3	Skill Lab	SAQ
(Sternum)	Practice the principles of Bioethics	C3		Viva OSPE
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Classify the joints of the thorax.	C2		
	• Discuss the type, ligaments and relations of the joints of the thorax (Manubriosternal,	C2		
	xiphisternal, costoverterbal, costotransverse, costochondral, chondrosternal,			MCQ
Joints of thoracic	interchondral and intervertebral joints).		Skill Lab	SAQ
wall	Discuss the components functions of the intervertebral disc.	C2		Viva OSPE
wall	Correlate the clinical conditions	C3	_	
	Understand the preventive and curative health care measures	C3		

	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	• Discuss the boundaries, shape and structure passing through superior thoracic aperture	C2		
	(viscera, blood vessels, nerve and muscles)			
	• Describe the thoracic inlet syndrome.	C3		MCQ
Thoracic apertures	• Discuss the boundaries, shape and structures passing through the inferior thoracic	C2	Skill Lab	SAQ
Thoracte apertures	aperture.			Viva OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Discuss the thoracic wall.	C2		
Intercostal	• Describe the intercostals muscles (origin, insertion, direction of fibers, nerve supply and	C2		
spaces /	actions.			MCQ
	• Discuss in detail the formation, branches, distribution and the related clinical of the	C3	Skill Lab	SAQ
Manager	intercostals nerves.			Viva OSPE
Movements of	• Explain the formation, course, relations, distribution and branches of the thoracic	C2		
thoracic wall	sympathetic trunk.			
	• Differentiate between the typical and atypical intercostals space.	C1		
	Compare the typical and atypical intercostals space.	C2		
	• Describe the types and axis of movements of vertebral column (flexion, extension, lateral flexion and rotation).	C2		
	• Define the respiratory movements on the basis of principles, factors and the different types	C1		
	(pump handle, bucket handle and piston).	<u> </u>	_	
	• Discuss the related physiological and pathological changes occurring (related to age movement etc).	C2		
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	• Describe the small and large openings in the diaphragm (vertebral level, location,	C2		MCQ

	formation, structures passing through and effects on the openings and structures by the diaphragmatic contraction).		Skill Lab	SAQ Viva OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics			
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	• Explain the arterial supply of intercostals space (anterior / posterior, parent vessels, branches, course, relations and termination).	C2		
Vessels and	• Differentiate between the arterial supply of typical and atypical intercostal space with the related clinicals.	C3		
lymphatics of	• Explain the venous drainage of the intercostal spaces (anterior / posterior, parent vessels, tributaries, course, relations and termination).	C2	Skill Lab	MCQ SAQ
thoracic wall	Differentiate between the venous drainage of typical and atypical intercostal space with the related clinicals	C3		Viva OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Discuss the origin of intercostal nerves.	C2		
_	Discuss course of nerves.	C2		
Innervation of	Discuss branches and related area supplied by these	C2		MCQ SAQ
Thoracic Wall	Correlate the clinical conditions	C3	Skill Lab	
	Understand the preventive and curative health care measures	C3		Viva OSPE
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Discuss visceral and parietal pleura	C2		
	Discuss the pleural recesses and pleural cavity.	C2		
Pleura	Describe the nerve and blood supply of pleura.	C2		MCQ
	Correlate the clinical conditions	C3	Skill Lab	SAQ
	Understand the preventive and curative health care measures	C3		Viva OSPE
	Practice the principles of Bioethics	C3		

	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Identify the features of right and left lung.	C1		
	Discuss the bronchopulmonary segments and their clinical significance	C3		
	Discuss and differentiate between the root of lung and the hilum of lung.	C2		MCQ
Lungs	Describe the nerve plexuses related to the lungs.	C2	Skill Lab	SAQ
Lungs	Explain the blood supply of lungs	C2	SKIII Lau	Viva OSPE
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		
	Identify heart borders	P1		
	aortic knuckle,	P1		
	• costophrenic angles,	P1		MCQ
Surface Marking	cardio phrenic angles,	P1	- Skill Lab	SAQ
Surface Marking	• domes of diaphragm,	P1		Viva OSPE
	• counting of ribs	P1		
	Correlate the clinical conditions	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read a research article	C3		

## **Physiology Small Group Discussion (SGDs)**

Topics	Learning Objectives	References	Learning Resources	Learning	Learning	Assessment
				Domains	Strategy	Tools
	• Define and explain the process	Physiological Basis of Medical	1. <a href="https://youtu.be/NFf">https://youtu.be/NFf</a>	C1		
	of acclimatization to low	Practice by Best & Taylor's.13 <sup>th</sup>	<u>Hh_rQZJE</u>	C1		MCQ
Physiology of unusual environment	<ul> <li>oxygen tension</li> <li>Describe acute and chronic mountain sickness</li> <li>Describe the effects of acceleratory forces on body in aviation and space physiology</li> </ul>	Edition.(Chapter 42,Page 659,663)  Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. (Chapter 44, Page 553)	2. <a href="https://www.physoc.org/careers/research/space-physiology/">https://www.physoc.org/careers/research/space-physiology/</a>	C1	SGD	SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE

Mechanics of pulmonary ventilation & compliance (Second week)  • Enumerate muscles of inspiration and expiration and • Describe mechanics of pulmonary ventilation • Describe surfactant, surface tension and collapse of alveoli • Define compliance.  • Draw compliance diagram of lungs.  Explain relationship of surface tension, radius of alveoli, elastic forces of lungs with compliance	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 621,629)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 569)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 189,197)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 36,Page 581) ,(Chapter 40,Page 629)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 38, Page 491,493)</li> </ul>	<ul> <li>https://www.ncbi.n lm.nih.gov/books/ NBK538324/</li> <li>https://youtu.be/BT wgmMfqOW4</li> </ul>	C1 C1 C1 C1 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
--	---	--	----------------------------	-----	---

Ventilation perfusion ratio & regulation of respiration (Second week)	<ul> <li>Define And Explain importance.</li> <li>Draw ventilation perfusion diagram Explain the concept of physiologic shunt and dead space</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 34, Page 636)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Mechanics of Breathing (Chapter 17, Page 587)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 194,225,229)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 39,Page 612)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.</li> <li>(Chapter 38, Page 497)</li> </ul>	https://youtu.be/U KsOLb5XWa0     https://teachmephy siology.com/respir atory-system/gas- exchange/ventilatio n-perfusion/	1. C1/C2 C1	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE
--	--	--	--	----------------	-----	---

## **Biochemistry Small Group Discussion (SGDs)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of lecture students should be able to	Domain	Strategy	Tool
	• Define buffers.	C1		MCQs
Body buffers	• Discuss Mechanism of various buffers in maintenance of blood PH.	C2	SGD	SAQs
				Viva
	• Enlist Components/ complexes of electron transport chain.	C1		
Electron transport	Describe Enzymes and Co-enzymes of each component.	C2	SGD	MCQs
chain	Discuss Inhibitors of these complexes.	C2		SAQs
	1			Viva
	<ul> <li>Describe various mechanisms of energy generation in the body.</li> </ul>	C2		
Mechanisms of			SGD	MCQs
energy generation in	<ul> <li>Discuss Oxidative Phosphorylation.</li> </ul>	C2		SAQs
the body.	• Describe uncouplers of ETC.	C2		Viva
	Define Vitamins	C1		
Vitamin	<ul> <li>Discuss the distribution, daily requirement and deficiency of</li> </ul>	C2	SGD	MCQs
	vitamins	C2		SAQs
	Clinical indication of vitamins			Viva

## **Anatomy Self-Directed Learning (SDL)**

Topics Of SDL	Learning Objective	References
Nose, paranasal sinuses, larynx, and trachea	<ul> <li>Describe anatomy of nasal cavity</li> <li>Describe the blood supply and the site of anastomosis in the nose.</li> <li>Discuss the nerve supply of nose</li> <li>Discuss the applied and the related clinical.</li> <li>Define and enumerate para nasal sinuses.</li> <li>Discuss the shape, location and their point of openings.</li> <li>Clinical significance with surgical interventions.</li> <li>Enumerate the components of larynx</li> <li>Describe paired and unpaired cartilages of larynx (origin, insertion nerve supply and action).</li> <li>Describe Intrinsic and extrinsic membrane (attachments and structure piercing the membranes).</li> <li>Discuss the movements of vocal cords and their effects on the voice and respiration.</li> <li>Discuss the applied and the related clinical.</li> <li>Describe the level of commencement of trachea, its termination and the tracheal cartilages.</li> <li>State the level of division of trachea</li> <li>Describe in detail the nerve supply and blood supply of trachea.</li> <li>Correlate the clinical aspects</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 395, 396, 973, 974, 978, 979) https://youtu.be/UPrY8JqXYCc https://youtu.be/IDBYF2i9vqU https://www.ncbi.nlm.nih.gov/books/NBK513272/
	Describe and classify the atypical ribs (side	Clinical Oriented Anatomy by Keith L. Moore.5TH

Skeleton of thoracic	determination, features, attachments, relations,	Edition. (Page 299).
wall	types and ossification.	https://youtu.be/PoA-Uq9w-7s
	<ul> <li>Differentiate between typical and atypical ribs.</li> </ul>	https://www.ncbi.nlm.nih.gov/books/NBK557710/
	<ul> <li>Discuss costal cartilages and their attachments.</li> </ul>	
	<ul> <li>Discuss the applied and the related clinicals.</li> </ul>	
	<ul> <li>Identify different parts of sternum.</li> </ul>	
	<ul> <li>Describe the bony features, attachments</li> </ul>	
	ossification of sternum	
	<ul> <li>Correlate the clinical aspects</li> </ul>	
	<ul> <li>Read relevant research article</li> </ul>	
	Use digital library	
	Discuss the thoracic wall.	Clinical Oriented Anatomy by Keith L. Moore.5TH
	• Describe the intercostals muscles (origin, insertion,	Edition. (Page 306, 307, 308).
	direction of fibers, nerve supply and actions.	https://youtu.be/NwDxbNqEVaA
Movements of thoracic	<ul> <li>Discuss in detail the formation, branches,</li> </ul>	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4534848/
	distribution and the related clinical of the	
wall and Intercostal	intercostals nerves.	
spaces	• Explain the formation, course, relations,	
	distribution and branches of the thoracic	
	sympathetic trunk.	
	<ul> <li>Differentiate between the typical and atypical</li> <li>intercostals space.</li> </ul>	
	<ul> <li>Compare the typical and atypical intercostals</li> </ul>	
	space.	
	• Describe the types and axis of movements of	
	vertebral column (flexion, extension, lateral	
	<ul> <li>flexion and rotation).</li> </ul>	
	• Define the respiratory movements on the basis of	
	• principles, factors and the different types (pump	
	handle, bucket handle and piston).	
	• Discuss the related physiological and pathological	
	changes occurring (related to age movement etc).	
	<ul> <li>Correlate the clinical aspects</li> </ul>	
	Read relevant research article	
	Use digital library	

Anatomy of diaphragm	diaphragm (vertebral level, location, formation, structures passing through and effects on the openings and structures by the diaphragmatic contraction).  • Correlate the clinical aspects  • Read relevant research article	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 297, 313, 314, 391, 396, 397, 412, 455, 457, 521, 523). https://youtu.be/6IK-YHK1ToM https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5184786/
	Use digital library  Disconnection and provided allowers	Clinical Oriental Anatamarka Waida I. Man. 5771
	<ul> <li>Discuss visceral and parietal pleura</li> <li>Discuss the pleural recesses and pleural cavity.</li> </ul>	Clinical Oriented Anatomy by Keith L. Moore.5TH Edition. (Page 333, 334, 335, 336).
Pleura	Describe the nerve and blood supply of pleura.	https://youtu.be/66PR3IYWb0A
	Correlate the clinical aspects	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332049/
	Read relevant research article	
	Use digital library	
	Identify the features of right and left lung.	Clinical Oriented Anatomy by Keith L. Moore.5TH
	Discuss the bronchopulmonary segments and their	Edition. (Page 337-347).
	clinical significance	https://youtu.be/66PR3IYWb0A
Lungs	• Discuss and differentiate between the root of lung and the hilum of lung.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4332049/
	Describe the nerve plexuses related to the lungs.	
	Explain the blood supply of lungs	
	Correlate the clinical aspects	
	Read relevant research article	
	Use digital library	

# Physiology Self-Directed Learning (SDL)

Topics Of SDL	Learning Objective	References	Learning	Learning	Learning	Assessment
			Resources	Domains	Strategy	Tools
Mechanics of pulmonary ventilation, Lung compliance	<ul> <li>Enumerate muscles of inspiration and expiration and</li> <li>Describe mechanics of pulmonary ventilation</li> <li>Describe surfactant, surface tension and collapse of alveoli</li> <li>Define compliance.</li> <li>Draw compliance diagram of lungs.</li> <li>1. Explain relationship of surface tension, radius of alveoli, elastic forces of lungs with compliance</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition.Section 06,Respiratory Physiology         (Chapter 34, Page 621,629)</li> <li>Human Physiology by Dee Unglaub Silver         thorn. 8<sup>TH</sup> Edition.Mechanics of Breathing         (Chapter 17,Page 569)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.         Respiratory Physiology (Chapter 5,Page         189,197)</li> <li>Physiological Basis of Medical Practice by         Best &amp; Taylor's.13<sup>th</sup> Edition.Section         05,(Chapter 36,Page 581) ,(Chapter 40,Page         629)</li> <li>Textbook of Medical Physiology by Guyton &amp;         Hall.14<sup>th</sup> Edition. (Chapter 38, Page 491,493)</li> </ul>	1. <a href="https://www.ncbi.">https://www.ncbi.</a> nlm.nih.gov/b ooks /NBK538324/ 2. <a href="https://youtu.be/B">https://youtu.be/B</a> TwgmMfqO W4	C1 C1 C1 C1 C1 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation

Pulmonary circulation & Pulmonary capillary dynamics. Physical principles of gas exchange & diffusion through respiratory membrane	<ul> <li>exchange of gases through the respiratory membrane</li> <li>Enlist four factors affecting the rate of gas diffusion through the respiratory membrane</li> <li>Define diffusing capacity of respiratory membrane.</li> <li>Describe the diffusing capacity for oxygen.</li> <li>Describe the diffusing capacity for carbon dioxide.</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology. 25<sup>TH</sup> Edition. Section 06, Respiratory Physiology (Chapter 34, Page 626,633,635)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Mechanics of Breathing (Chapter 17, Page 574)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Respiratory Physiology (Chapter 5, Page 209)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 05, (Chapter 37, Page 592)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 39, Page 503)</li> <li>(Chapter 40, Page 511,515)</li> <li>1. https://youtu.be/aJPw</li> <li>UnZ tycQ</li> <li>C1 C1 C</li></ul>	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
	oxygen.  • Describe the diffusing capacity for			

Pulmonary volumes, capacities & functions of respiratory tract	<ul> <li>Define lung volumes and capacities.</li> <li>Define the four pulmonary volumes and capacities.</li> <li>Enlist normal values of all the lung volumes and capacities</li> <li>Draw a graph representing all the lung volumes and capacities.</li> <li>Describe how lung volumes and capacities can be measured with spirometer.</li> <li>Enlist the lung volumes and capacities which can't be measured by spirometer</li> </ul>	•	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 06,Respiratory Physiology (Chapter 34, Page 628) Human Physiology by Dee Unglaub Silver thorn. 8 <sup>TH</sup> Edition.Mechanics of Breathing (Chapter 17,Page 578) Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 191) Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. (Chapter 38, Page 495)	hD1 https logy syste	s://yout u.be/9VdH vcDU s://teac hmephysio c.com/r espiratory- em/ven tilation/lun olumes/	C1 C1 C1 C1 C1 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
Transport of oxygen	Describe in detail the transport of oxygen from lungs to tissues	•	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 35, Page 639) Human Physiology by Dee Unglaub Silver thorn. 8 <sup>TH</sup> Edition.Gas Exchange and Transport (Chapter 18, Page 599) Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition. Respiratory Physiology (Chapter 5,Page 210,213,216) Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition.Section 05,(Chapter 38,Page 603) Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. (Chapter 41, Page 521)		1. <a href="https://teachm">https://teachm</a> <a href="mailto:ephy">ephy</a> <a href="mailto:siology.com/re">siology.com/re</a> <a href="mailto:spir atory-system/gas-exchange/oxyg">system/gas-exchange/oxyg</a> <a href="mailto:en-transport/">en-transport/</a> <a href="mailto:Lyoutu.b">2. <a href="https://youtu.b">https://youtu.b</a> <a href="mailto:e/H">e/H</a> <a href="mailto:U6 LQldvog">U6 LQldvog</a> <a href="mailto:u6 LQldvog">U6 LQldvog</a></a>	C1	SDL	MCQ SEQ VIVA VOCE

Chemical regulation of respiration & exercise changes	<ul> <li>Describe in detail the role of respiratory centers in the regulation of respiration.</li> <li>Explain chemical control of respiration in detail</li> <li>Describe changes in respiration during exercise. Enumerate and briefly explain factors which affect respiration.</li> <li>Describe briefly the mechanism of periodic breathing and sleep apnea</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 06, Respiratory Physiology (Chapter 36, Page 657,664)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Respiratory Physiology (Chapter 5,Page 233,235)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.Section 05,(Chapter 41,Page 649)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 42, Page 533,536)</li> <li>Inttps://youtu be/g C1 C1</li> <li>R RLgo9V n0</li> <li>https://journa bs.ph</li> <li>ysiology.org/doi/a</li> <li>bs/10.1152/p</li> <li>hysre v.1925.5.4.55</li> <li>12jo</li> <li>urnalCode=ph ysre v</li> </ul>	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation
Hypoxia, hypercapnia, cyanosis	<ul> <li>Define hypoxia and hypercapnia. Enumerate and explain its various types.</li> <li>Enumerate the roles of oxygen therapy in different types of hypoxia</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition.Section 06, Respiratory Physiology         (Chapter 35, Page 646,650)         Physiology by Linda S. Costanzo 6<sup>th</sup>         Edition.Respiratory Physiology (Chapter 5,Page 239)         Physiological Basis of Medical Practice by         Best &amp; Taylor's.13<sup>th</sup> Edition.Section         05,,(Chapter 41,Page 653) (Chapter 42,Page 662)         Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. (Chapter 43, Page 546)</li> </ul>	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Assessment, MST based Assessment) OSPE SDL Evaluation

## **Biochemistry Self-Directed Learning (SDL)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of lecture students should be able to	Domain	Strategy	Tool
	Define of pH and pKa	C1		
HH equation	Elaborate Henderson Hasselbalch equation.	C2	SDL	MCQs
	Describe Measurement of pH by equation.	C2		SAQs Viva
	• Define buffers.	C1		
Role of Chemical	Discuss Mechanism of various buffers in maintenance of blood pH.	C2	SDL	MCQs
Buffers in pH regulation	Elaborate the carbonic acid-bicarbonate buffer system			SAQs Viva
	Measure the pH of solution in Pharmaceutical, Chemical, and Biotechnology Industry	C2		
pH meter and	• Elaborate the Bicarbonate and Phosphate system of Buffers and intracellular and extracellular proteins	C1		MCQs
physiological buffers in pH regulation		C1	SDL	SAQs Viva
	Discuss Vitamin B <sub>6</sub> , used as a dietary supplement	C2		MCQs
Vitamin	Describe its deficiency and related clinical disorders	C2	SDL	SAQs
Pyridoxine		C2		Viva
	Define xenobiotics	C1		MCQs
Xenobiotics	Discuss its metabolism and its role in environment	C2	SDL	SAQs
				Viva

## **Histology Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Practical Students Should Be Able To	Domain	Strategy	Tool
Olfactory	Identify microscopic structure of respiratory and nasal mucosa under microscope.	P1		
/Nasal	Illustrate histological structures of olfactory / nasal mucosa	C1	Skills	OSPE
mucosa	Write two points of identification	C1	Lab	
	Identify types of cells and epithelium of epiglottis under	P1		
	microscope			
<b>Epiglottis</b>	Illustrate histological structure of epiglottis.	C1	Skills	OSPE

	Write two points of identification	C1	Lab	
	Identify microscopic structure of trachea.	P1		
Trachea	Illustrate microscopic structure of trachea.	<b>C</b> 1	Skills	OSPE
	Write two points of identification	C1	Lab	
Lungs	<ul> <li>Identify microscopic structure of, bronchi, terminal bronchiole, respiratory bronchiole, alveoli, alveolar duct of the respiratory tract on the basis of</li> <li>Types of epithelial cells present</li> <li>Relative amount of gland, cartilage, smooth muscles and connective tissue fibers present in wall of the tubes.</li> </ul>	P1	Skills Lab	OSPE
	• Illustrate microscopic structure of different layers of respiratory passages.	C1		
	Write points of identification of each part	<b>C</b> 1		

# Physiology Practicals Skill Laboratory (SKL)

Topic	Learning Objectives	Reference	Learning	Learning	Assessment
			Domains	Strategy	Tools
Measurement of different lung volume & capacities with the help of spirometer	<ul> <li>Description of its various parts</li> <li>Importance of spirometer for measurements of various volumes</li> <li>Define various lung volumes &amp; capacity</li> <li>How to measure them</li> </ul>	Practical Notebook of Physiology First year MBBS by Dr Saqib Sohail	C1/C3 A3 P3	Practicals /skill lab	Viva Voce Ospe Video Assissted Assessment
Recording of normal and modified movement of respiration (Stethography)	<ul> <li>Introduction to stethography</li> <li>How to use it and its clinical importance</li> </ul>	Practical Notebook of Physiology First year MBBS by Dr Saqib Sohail	C1/C3 A3 P3	Practicals /skill lab	Viva Voce Ospe Video Assissted Assessment

	Detail introduction and	Practical Notebook of Physiology	C1/C3		
Clinical examination of	explanation about inspection	First year MBBS by Dr Saqib	A3	Practicals	Viva Voce
chest for respiration	Palpation	Sohail	P3	/skill lab	Ospe
	Percussion				Video
	Auscultation				Assissted
	Nuscuitation				Assessment

## **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives		Teaching	Assessment
	At The End Of Practical Students Should Be Able To	Domain	Strategy	Tool
Henderson Hassel batch	Illustrate Henderson Hassel batch equation.	P	Skill lab	OSPE
equation	Measure pH by equation.			
Buffers	Illustrate buffer actions and buffer zone.	P	Skill lab	OSPE
pH meter	Measure the acidity or basicity of water-based solutions	P	Skill lab	OSPE

## **Basic and Clinical Sciences (Vertical Integration)**

#### Content

- Case Base Learning (CBLs)
- Problem Base Learning (PBls)
- Vertical Integration LGIS

# **Case Based Learning Objectives (CBL)**

Subject	Topic	Learning Objectives	Learning
		At the end of the lecture the student should be able to	Domain
	<ul> <li>Lung's cancer</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
Anatomy	<ul> <li>Chest trauma</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
	<ul> <li>Wheeze/Stridor</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
Physiology	<ul> <li>Crib Death</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
	• CBL-ABGs	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• CBL – uncouplers	Apply basic knowledge of subject to study clinical case.	C3

# **Vertical Integration LGIS**

## Pathology

Topic	At the End of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
	Discuss Pneumonia in detail.	C1		
	Discuss Tuberculosis in detail.	C1	1 010	1.600
Clinical disorders	Discuss Cystic fibrosis in detail.	C1	LGIS	MCQs
of Respiration:	Discuss Respiratory Failure Incidence in detail.	C1		
	Discuss Sign and symptoms in detail.	C1		
	Discuss Pathophysiology in detail.	C1		

## Surgery

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Chest	<ul><li>Describe:</li><li>Various chest deformities &amp; congenital malformations</li></ul>	C2		
Deformities	Significance of deformities	C2	LGIS	MCQs
(Congenital)	General and operative management outline	C2		
	<ul><li> Describe:</li><li> Various types of Pnuemothorax</li></ul>	C2		
Pneumothorax	• Causes	C2	LGIS	MCQs
	• Signs and symptoms Significance of tension pneumothorax	C2		
	Emergency and definitive management	C2		
	Describe:	C2		
	Various types of Hemothorax			
Hemothorax	Causes of Hemothorax	C2	LGIS	MCQ
	Signs and symptoms of Hemothorax	C2		
	Emergency and definitive management			
	Describe:	C1		
	Definition			
DI 1 CC '	• Causes	C2	LGIS	MCQ
Pleural effusion	• Signs &symptoms	C2		
	General and operative management outlines			

## **ENT**

Topic	At The End Of Lecture Students Should Be Able	Learning	Teaching	Assessment
	То	Domain	Strategy	Tool
	Define tonsillitis	C1		
Tonsillitis	Enlist the causes of tonsillitis	C1	LGIS	MCQs
	List the clinical features of tonsillitis	C2	CBL	
	Enumerate the management of tonsillitis	C1		

Foreign body	Classify foreign bodies	C1	LGIS	
nose & ear	• Enumerate emergency situations for removal.	C2	CBL	MCQs

#### Medicine

Topic	At the End Of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
	• Discuss TB.	C2		
Tuberculosis	Discuss its diagnostic Criteria.	C2	LGIS	MCQs
	Describe How to treat a patient with TB.	C2		
Drowning &	• Discuss How to manage a patient with drowning and strangulation.	C2	LGIS	MCQs
Strangulation				

#### **Spiral Courses**

#### **Content**

- Longitudinal Themes
  - o The Holy Quran Translation
  - o Behavioral Sciences & Biomedical Ethics
  - o Climate Change & Health & Community Medicine
  - o Artfifiial Intelligence (AI)
  - o Family Medicine
  - o Early Clinical Exposure (ECE)

#### **Behavioral Sciences & Biomedical Ethics**

Topic	At the End of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
Crises intervention	• To be able identify crises situations and learn the means to	C1	LGIS	
and disaster	cope with them during disasters either natural or man made	C2	CBL	MCQS
Conflict resolution and	• To be able to identify crises situations and using empathy	C2	LGIS	
empathy	how to deal with these situations arising in clinical practice		CBL	MCQS

## **Climate Change & Health & Community Medicine**

Topic	At the End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Air and Ventilation Air composition	<ul> <li>At the end of the session the students will be able to:</li> <li>Enlist indices of thermal comfort</li> <li>Describe the factors responsible for vitiation of</li> </ul>	C1 C2	LGIS	MCQ
& indices of thermal comfort	air			
Air pollution and its factors	<ul> <li>Define air pollution</li> <li>Identify sources of air pollution and air pollutants</li> </ul>	C1 C1	LGIS	MCQ
Preventive measures to control air pollution	<ul> <li>Demonstrate selection of air sample for analysis</li> <li>Enumerate the methods to prevent &amp; control of air pollution</li> </ul>	C2 C1	LGIS	MCQ
Air purification methods	Enlist natural and artificial methods of air purification.	C1	LGIS	MCQ
	Describe the greenhouse effect	C2		
Greenhouse effect	<ul><li>Enlist greenhouse gases.</li><li>Identify sources of greenhouse gases</li></ul>	C1	LGIS	MCQ
	Demonstrate global warming.	C2		

Global warming and			LGIS	MCQ
climate change	<ul><li>Define ozone hole.</li><li>Describe link between global warming and climate change</li></ul>	C1 C2		

## **Artificial Intelligence (AI)**

Topic	At the End of Lecture Students Should Be	Learning	Teaching	Assessment
	Able To	Domain	Strategy	Tool
Artificial Intelligence basic concepts	To learn the concept of deep and superficial neural networks in AI	C2	LGIS	MCQs

## **Family Medicine**

Topic	At the End of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
	Define cough & hemoptysis.	C1		
Approach to a Patient	• Discuss differential diagnoses cough & hemoptysis.	C2	LGIS	MCQs
with cough & hemoptysis	When to refer a patient of cough & hemoptysis to	C2		
	pulmonologist			



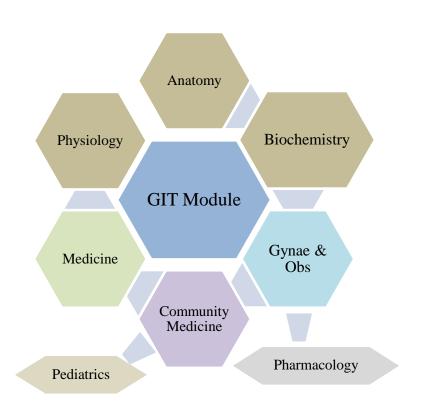




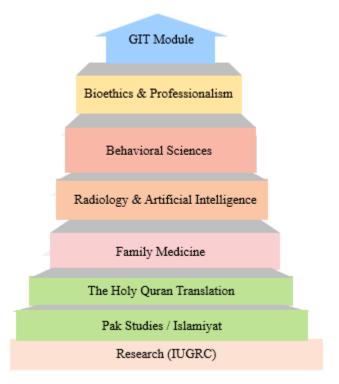
# **Gastrointestinal Tract Module**



## **Integration of Disciplines in GIT Module**



#### **Spiral /General Education Cluster Courses**



# Discipline wise Details of Modular Content

Block	Module	General Anatomy	Embryology	Histology	Gross Anatomy
	Anatomy	-	Tongue, Body	Digestive	Oral Cavity, Abdomen and associated visceras
			Cavities,	Tract &	
			Gastrointestinal	associated	
			System	organs	
				(Junqueira)	
	Biochemistry				n, GIT Hormones LFTs, Jundice & Nutrition,
	Physiology	General Principles of Gastrointestinal I	•	, Nervous Cont	rol, and Blood Circulation
		Propulsion and Mixing of Food in the	_	1 41	
		Secretory Functions of the Alimentary	_	nd Absorption 11	n the Gastrointestinal Tract
		Physiology of Gastrointestinal Disorde	rs rientation Session		
1	Department of Medical	Orientation Session on Curricular Re			2022
	Education (DME)				2023
	Education (DIVIE)	Student Session on Standardization of	Spiral Courses	gies	
	The Holy Quran Translation	The Holy Quran Translation Compone			
	The Hory Quran Translation	Imaniat I	III		
		Ibadat I			
		• Ibadaat-II			
		• Imaniyaat-II			
		Ibadaat-III			
		• Inadaat-III			
	Pak Studies/Islamiyat	Tehreek-E-Pakistan Islaahi Tehreeka	oin.		
	Tax Studies/Islamiyat	Akhirat-I	aiii		
		• Toheed			
		<ul><li>Qayam e Pakistan, Aghraaz o Maqas</li></ul>	oid.		
		<ul> <li>Qayani e Fakistan, Aginaaz o Maqas</li> <li>Tehreek-e-Aligarh, Sir Syed Ahmad</li> </ul>			
		Akhirat -II	Kiiaii		
	Bioethics & Professionalism	Pakistan Medical & dental council C	Toda of Ethios		
	Research (IUGRC)				
	Research (TOURC)	• Introduction to descriptive statistics	(Research-1)		

	Classification of different types of Data (Research-II)
	• Scales of Data measurement (Research-III)
	Measures of central Tendency (Research-IV)
	Compute & Interpret measures of central tendency (Research-V)
	Measure of dispersion/ Secondary data Analysis (Research-VI)
Radiology & Artificial	Medical imaging of abdomen- I
Intelligence	Medical imaging of abdomen-II
Family Medicine	Common Abdominal diseases
Behavioral Sciences	Eating Disorders
	Vertical Integration
Clinically content relevant	to GIT module
• Concept of health & di	sease (Community medicine)
Epidemiology of infect	tious diseases & Basic Concepts (Community medicine)
Peptic ulcer (Medicine	)
• Jaundice (Medicine)	
Irritable Bowel Syndro	ome (Medicine)
• Antidiarrheal drugs &	drugs for Peptic Ulcer Disease (Pharmacology)

**Clinical Themes** 

• Common GIT problems in pregnancy (Hyperemesis gravidarum, GERD, Constipation, hemorrhoids) (Gynae and OBS)

Acute & Chronic Diarrhea (Pediatrics)

Jaundice

• Irritable Bowel Syndrome

#### **GIT Module Team**

Module Name : GIT Module

Duration of module : 06 Weeks

Focal Person Community

Focal Person Family Medicine

Focal Person Quran

**Translation Lectures** 

Medicine

Coordinator : Dr. Uzma Kiyani Co-coordinator : Dr. Minahil Haq Reviewed by : Module Committee

Dr. Afifa kalsoom

Dr. Uzma Zafar

Dr. Sadia Khan

Modul	e Committee	Mod	lule Task Force Team	
Vice Chancellor RMU	Prof. Dr. Muhammad Umar	Coordinator	Dr. Uzma Kiyani (Senior Demonstrator of Physiology)	
Director DME	Prof. Dr. Rai Muhammad Asghar	DME Focal Person	Dr. Sidra Hamid (DHPE)	
Convener Curriculum	Prof. Dr. Naeem Akhter	Co-coordinator	Dr. Shazia Nosheen (Senior Demonstrator of Physiology)	
Chairperson Anatomy &	Prof. Dr. Ayesha Yousaf	Co-Coordinator	Dr. Minahil Haq (Senior Demostrator of Anatomy)	
Dean Basic Sciences				
Additional Director DME	Prof. Dr. Ifra Saeed	Co-coordinator	Dr. Uzma Zafar (APWMO of Biochemistry)	
Chairperson Physiology	Prof. Dr. Samia Sarwar			
Chairperson Biochemistry	Dr. Aneela Jamil	DME Implementation Team		
		Director DME	Prof. Dr. Rai Muhammad Asghar	
Focal Person Anatomy	Dr. Maria Tasleem	Implementation Incharge 1st & 2 <sup>nd</sup> Year	Prof. Dr. Ifra Saeed	
Second Year MBBS		MBBS & Add. Director DME		
Focal Person Physiology	Dr. Sidra Hamid	Module planner & Implementation	Dr. Sidra Hamid	
		Coordinator		
Focal Person Biochemistry	Dr. Aneela Jamil	Editor	Muhammad Arslan Aslam	
Focal Person Pharmacology	Dr. Zunera Hakim			
Focal Person Pathology	Dr. Asiya Niazi			
Focal Person Behavioral	Dr. Saadia Yasir			
Sciences				

#### **Module I -GIT Module**

**Rationale:** GIT module has been designed to unravel the basic structure function of the alimentary system along with its embryological development and anomalies. The composition of the food is complex and little of it is water soluble. Therefore, it cannot enter body fluids. Hence it needs to be broken down into its chemical components before it can be absorbed. Four activities of the GIT tract can be identified for this process to occur. These are:

**Motility:** The term is used to describe the movements of the GIT tract. These movements are responsible for breaking down and pushing the food along the alimentary tract and to its destination as feces.

**Secretion:** Different secretion of the GIT are concerned with breakdown of food into its digestive particles

Digestion: Break down of food into small pieces. It is produced by the mechanical activity of the alimentary tract. The surface of the food is exposed to enzymatic activity.

**Absorption:** The transfer of nutrients or the digestive products from the lumen to blood or the lymph.

Disruption of any of its activities can lead to disease states such as pain, peptic ulceration, diarrhea & constipation.

Coordination of all these functions is brought about hormones of GIT and exocrine pancreas.

#### **Module Outcomes**

At the end of this module the student should be able to:

#### Knowledge

- Explain the structural & developmental organization of GIT.
- Explain the composition, functions, mechanism & control of following gastrointestinal secretions: salivary, gastric, pancreatic, biliary, small & large intestines.
- Explain the swallowing and motility patterns in the GIT & its role in mixing, propulsion & evacuation of feces.
- Describe the mechanism of absorption of various nutrients and their role in malabsorption syndrome.
- Explain the physiological anatomy, biochemistry functions and dysfunctions of Liver.
- Explain the formation, function & control of secretion of bile.
- Explain the GIT hormones (structure, function) & their role in secretion and motility.
- Apply the knowledge of the basic sciences to understand pathophysiology of common GIT diseases.

- Appreciate concepts & importance of
  - o Family Medicine
  - o Biomedical Ethics
  - o Artificial Intelligence
  - o Research

#### **Skills**

- Dissect various parts of GIT, and related structures including peritoneum, to demonstrate their gross Anatomy and relationship to each other.
- Identify different organs of GIT under microscope and on model.

#### Attitude

• Demonstrate a professional attitude, team-building spirit and good communication skills.

This module will run in 6 weeks duration. The content will be covered through introduction of topics. Instructional strategies are given in the timetable and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

#### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self-Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



# Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry) Anatomy Large Group Interactive Session (LGIS)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
	Embryology			
	• Describe the development of pharyngeal apparatus	C2		
	• Enlist the sources for development of different parts of tongue.	C1		
Embryology	• Explain the development of tongue along with its nerve supply.	C2	I CIG	SAQ
Development of Tongue	<ul> <li>Describe the congenital anomalies associated with tongue</li> </ul>	C2	LGIS	MCQ VIVA
Tongue	Describe the developmental basis of physiological and biochemical mechanisms involved in perception and transmission of taste sensation	C2		OSPE
	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures	C3		
	Practice the principles of bioethetics	C3		
	<ul> <li>Apply strategic use of A.I in health care</li> <li>Read relevant research articles</li> <li>Use HEC digital library</li> </ul>	C3 C3 C3		
	Enumerate different body cavities	C1		
	Describe division of embryonic body cavity	C2		
Embryology Development of	Discuss formation and significance of pleuropericardial membranesand pleuroperitoneal membranes	C2	LGIS	SAQ MCQ
Body cavities I & II	Describe muscular ingrowth from Lateral body walls	C2		VIVA
	Correlate with the clinical conditions	C3		OSPE
	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	• Use of HEC digital library	C3		
Embryology	• Explain different stages of development of salivary glands	C2		
Development of	• Enlist the sourse for development of different type of salivary gland	C1		
Salivary glands	• Explain development of its nerve supply	C2	1 010	SAQ
	Describe the congenital anomalies associated with salivary glands	C2	LGIS	MCQ

	Correlate with the clinical conditions	C3		VIVA
	Understand curative and preventive heath care measures	C3		OSPE
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	• Discuss the formation of tracheoesophageal septum and its importance	C2		
	Describe salient features of esophageal development	C2		
	Describe congenital anomalies of esophagus	C2	I GIG	SAQ
	• Describe the developmental basis for the physiological and biochemical	C2	LGIS	MCQ
Embryology	mechanisms involved in the process of swallowing			VIVA OSPE
Development of	Correlate with the clinical conditions	C3		OSIL
Esophagus	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Explain the development of stomach	C2		
<b>.</b>	• Discuss rotations and positional shifts of stomach & their effect on nerve	C2		G + O
Embryology	supply and peritoneal attachments		I CIG	SAQ
Development of Stomach	Explain formation of omental bursa.	C2	LGIS	MCQ VIVA
Stomach	Describe congenital anomalies of stomach	C2		OSPE
	• Describe the developmental basis for the physiological and biochemical	C2		OSIL
	mechanisms involved in the process of digestion in the stomach			
	Discuss pernicious anemia	C2		
	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3	1	
	Use of HEC digital library	C3		
	Describe formation of hepatic diverticulum	C1		
	Describe histogenesis of liver during intrauterine life	C1		

	Describe formation of various ligaments of liver.	C1		
	Discuss congenital abnormalities of liver	C3		
Embryology	• Describe the developmental basis for the physiological and biochemical	C2		
Liver	mechanisms involved in the process of detoxification in the liver			SAQ
	Correlate with the clinical conditions	C3	LOIG	MCQ
	Understand curative and preventive heath care measures	C3	LGIS	VIVA OSPE
	• To practice the principles of bioethetics	C3		OSPE
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Discuss development of Gall bladder	C2		
	Describe /congenital anomalies of gall bladder	C2		
Embryology	Discuss development and congenital anomalies of pancreas	C2		SAQ
Gall bladder,	Describe development of extrahepatic biliary apparatus and its parts with	C2	LGIS	MCQ
pancreas and	abnormalities			VIVA
Biliary apparatus	Describe the developmental basis for the physiological and biochemical	C2		OSPE
	mechanisms involved in the process of production of bile and pancreatic			
	vsecretions			
	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	• Describe development of mid gut, midgut loop and rotation of midgut loop.	C2		
Embryology	• Explain physiological umbilical hernia and return of mid gut to abdomen.	C2	LGIS	SAQ
Development of	• Describe fixation of intestines and transformations in peritoneal dispositions	C2		MCQ
small intestine	after mid gut loop return.			VIVA
	Describe congenital anomalies and clinical correlation of mid gut	C2		OSPE
	development.			
	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		

	Use of HEC digital library	C3		
	Enlist parts of large intestine.	C2		
	Describe partitioning of cloaca and cloacal membrane.	C2		SAQ
	Describe development of anal canal.	C2	LGIS	MCQ
Embryology	Describe congenital anomalies of large intestine.	C3		VIVA
Development of	Correlate with the clinical conditions	C3		OSPE
large intestine	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Histology			
	Discuss surfaces of tongue with their histological features	C1	LGIS	
	• Describe different papillae of tongue with their location & features	C2		SAQ MCQ VIVA OSPE
***	Explain histological features of taste buds	C2		
Histology	Discuss leukoplakia and oral thrush	C2		
Tongue	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Enlist major salivary glands	C2		
Histology	Explain histological structure of salivary glands	C2	LGIS	SAQ
Salivary glands	Discuss different cells forming parenchyma of salivary glands	C2		MCQ
	Discuss histology of duct system	C2		VIVA
	Differentiate between major salivary glands on histological basis	C2		OSPE
	Discuss effects of viral infections on salivary glands	C3		
	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Describe the developmental basis of physiological and biochemical	C2		

Histology	mechanisms involved in perception and transmission of taste sensation			SAQ
General	Describe the histological characteristics of each—layer with functional	C2	]	MCQ
organization of GIT	significance		LGIS	VIVA
	• Discuss associated clinicals (megacolon, chagas disease)	C2		OSPE
	• Correlate with the clinical conditions	C3		
	<ul> <li>Understand curative and preventive heath care measures</li> </ul>	C3		
	To practice the principles of bioethetics	C3	_	
	Apply strategic use of A.I in health care	C3	_	
	Read relevant research articles	C3	_	
	Use of HEC digital library	C3		
	• Describe the histological layers of esophagus.	C2	_	
	• Compare between various portions of esophagus histologically.	C2	LGIS	SAQ
Histology	• Discuss GERD	C2		MCQ VIVA
Esophagus	• Correlate with the clinical conditions	C3		OSPE
1 0	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Describe the histological layers of different parts of stomach	C2	LGIS	SAQ
	Describe histological differences of different parts of the gastric glands	C2		MCQ VIVA
	• Describe the structure and function of different cells of gastric glands	C2		OSPE
Histology Stomach	Explain clinical conditions associated with stomach histologically	C2	-	
Stomach	Discuss pernicious anemia	C2	1	
	Correlate with the clinical conditions	C3	1	
	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	• Use of HEC digital library	C3		
	Discuss in detail the histological organization of liver	C2		

	• Explain the structure of liver lobule, portal triads& hepatic acinus and its functional importance	C2	LGIS	SAQ MCQ
	Discuss histological features of hepatocytes.	C2	LOID	VIVA
	Explain Hepatic cords, central vein, portal triad, hepatic venules, hepatic arterioles, bile duct & liver sinusoids.	C2	-	OSPE
Histology	• Discuss the blood supply of the liver.	C2	1	
Liver	• Explain different cells of the liver tissue	C2	1	
	Describe clinical aspects of liver on histological grounds	C2		
	Discuss cirrhosis, fatty liver	C2	1	
	Discuss jaundice	C2		
	Correlate with the clinical conditions	C3	1	
	Understand curative and preventive heath care measures	C3		
	To practice the principles of bioethetics	C3	1	
	Apply strategic use of A.I in health care	C3	1	
	Read relevant research articles	C3	1	
	Use of HEC digital library	C3	1	
	Correlate with the clinical conditions	C3	1	
	Differentiate between exocrine and endocrine pancreas.	C2		
Histology	Discuss the cellular structure and function of exocrine pancreatic acinus and ducts.	C2		
Pancreas & Gall	Discuss acute & chronic pancreatitis and pancreatic cancer	C2	]	
Bladder	Explain the histological features of the gallbladder.	C2	1	SAQ
	Discuss cholelithiasis	C2	LGIS	MCQ
	Correlate with the clinical conditions	C3		VIVA
	Understand curative and preventive heath care measures	C3	1	OSPE
	To practice the principles of bioethetics	C3	]	
	Apply strategic use of A.I in health care	C3	1	
	Read relevant research articles	C3	1	
	Use of HEC digital library	C3	1	
	Differentiate the histological features of duodenum, jejunum and ileum	C2		
Histology	Discuss the location and function of villi, crypts of liberkuhn and	C2		
Small Intestine	microvilli in different parts of small intestine	C2		
	Discuss different cells lining the epithelium of small intestine	C2		
	Discuss histological aspects of celiac disease and crohn disease	C2		
	Correlate with the clinical conditions	C3		

	Understand curative and preventive heath care measures	C3	
	To practice the principles of bioethetics	C3	
	Apply strategic use of A.I in health care	C3	
	Read relevant research articles	C3	
	Use of HEC digital library	C3	
	Describe histological features of parts of large intestine.	C2	
	Discuss cells lining the epithelium	C2	
Histology	Explain concept of tenaei coli.	C2	
Large Intestine I (General	Differentiate histological structure of the large intestine from the small intestine.	C2	
Histological	Correlate with the clinical conditions	C3	
Features)	Understand curative and preventive heath care measures	C3	
	To practice the principles of bioethetics	C3	
	Apply strategic use of A.I in health care	C3	
	Read relevant research articles	C3	
	Use of HEC digital library	C3	
	Correlate with the clinical conditions	C3	
	Describe histological features of appendix, caecum, rectum and anal canal		
	Discuss clinical conditions (Colorectal cancer)		
Histology	Correlate with the clinical conditions	C3	
Large Intestine II (Histological Features of different parts)	Understand curative and preventive heath care measures	C3	
	To practice the principles of bioethetics	C3	
	Apply strategic use of A.I in health care	C3	
different parts)	Read relevant research articles	C3	
	Use of HEC digital library	C3	

## **Physiology Large Group Interactive Session (LGIS)**

Topic	Learning Objectives		_	Assessment
	At the end of lecture students should be able to	Domain	Strategy	Tools
Introduction to GIT,	<ul> <li>Explain the physiologic anatomy of GIT</li> </ul>	C2		
Electrical activity in	• Summarize the functions of GIT	C1		
GIT	• Explain the electrical activity of GIT smooth muscle	C2		
Movements of GIT	• Describe the concept of slow waves and spike potentials	C1		

	Explain resting membrane potential and factors affecting RMP	C2		
	Explain role of calcium ions in muscle contraction	C2		SEQ
	Describe tonic contraction in GIT smooth muscles	C1	LGIS	MCQ
	Enumerate different types of movements in GIT	C1		VIVA
	Define propulsive movements	C1		
	Define mixing movements	C1		
	Describe sites of peristaltic movement in GIT	C1		
	Describe stimulus, mechanism and direction of peristaltic movement	C1		
	Discuss role of Myenteric plexus in peristaltic movement	C2		
	Explain peristaltic reflex and Law of gut	C2		
	Describe mechanism and function performed by mixing movements	C1		
	Describe physiological anatomy of enteric nervous system	C1		
	Enlist functions of enteric nervous system	C1		
Enteric nervous	Compare and contrast Myenteric and Meissner's plexus	C2		SEQ
system and GIT	Enumerate neurotransmitters of enteric nervous system	C1	LGIS	MCQ
reflexes	Describe the autonomic regulation of enteric nervous system	C1		VIVA
	Enumerate afferent sensory connections of enteric nervous system	C1		
	Discuss the physiology of GIT reflexes	C2		
	Explain GIT reflexes integrated at the level of gut wall,	C2		
	prevertebral sympathetic ganglia and spinal cord/brain stem			
	• Enumerate hormones of GIT	C2		
Control of GIT	Describe the hormonal control of GIT motility	C1		
motility and factors	• Explain site of secretion, stimuli for secretion and actions of Gastrin,	C2		SEQ
affecting GIT blood	Cholecystokinin, Secretin, Gastric inhibitory peptide and Motilin		LGIS	MCQ
flow	Discuss the factors affecting GIT blood flow	C2	_	VIVA
	Recall anatomy of GIT blood supply	C1	_	
	Explain splanchnic circulation and hepatic portal circulation	C2	_	
	• Describe the significance of blood flow to liver through portal vein	C1	_	
	• Describe special organization of blood flow through intestinal	C1		
	villus			
	Explain factors affecting gastrointestinal blood flow	C2	_	
	Describe counter current blood flow in villi.	C1	_	
	Explain nervous control of GIT blood supply	C2	_	
	• Discuss physiological importance of sympathetic vasoconstriction in GIT under special conditions	C2		

	Describe the secretion and composition of saliva and its physiologic roles	C1		
	• Describe the nervous regulation of saliva	C1	-	
	Describe mastication	C1		
	• Enumerate functions of mastication	C1	1	
	Explain role of teeth and muscles of mastication	C2	1	ano.
Carrellorsia at and	Describe the steps and nervous control center of chewing reflex	C1	LCIC	SEQ
Swallowing1 and (Mastication and	Introduce swallowing	C1	LGIS	MCQ VIVA
Saliva)	• Enumerate stages of swallowing (voluntary/involuntary)	C1	1	VIVA
Sunva	• Explain in detail each stage of swallowing	C2	1	
	<ul> <li>Voluntary stage Mechanism</li> </ul>			
	<ul> <li>Pharyngeal stage (reflex act)</li> </ul>			
	<ul> <li>Stimulus, receptors, afferents, center, efferent, effectors,</li> </ul>			
	response			
	<ul><li>Relate pharyngeal stage with process of respiration</li><li>Esophageal stage</li></ul>			
	• Primary peristalsis Secondary peristalsis (stimulus, afferent,	C2	-	
	center, efferent, response)			
	Describe physiological anatomy and function of Lower esophageal sphincter	C1		SEQ
Swallowing -II	Explain receptive relaxation of stomach with nervous pathway	C2	LGIS	MCQ
	Describe physiological anatomy and function of distal end of esophagus	C1		VIVA
	Define Achalasia cardia	C1		
	Describe causes, effects and treatment of achalasia cardia	C1	1	
Clinical disorders of	Define vomiting	C1	1	SEQ
swallowing	Describe stimuli & nervous pathway of vomiting	C1	LGIS	MCQ
(Achalasia cardia,	Discuss act of vomiting	C2	1	VIVA
vomiting & nausea)	Describe chemoreceptor trigger zone	C1	1	
	Define nausea	C1	1	
	• Enlist causes of nausea	C2	1	
Regulation of	Discuss in detail gastric factors that promote emptying and	C2		
	duodenal factors that inhibit emptying			SEQ
Stomach emptying	• Explain the role of enterogastric nervous reflexes and hormonal feedback	C2	LGIS	MCQ VIVA
	Recall physiological anatomy of stomach	C1		

	<ul> <li>Describe motor functions of stomach in detail</li> <li>Storage</li> </ul>	C1		
Motor functions of	2. Mixing and propulsion of food chyme and Hunger contractions			SEQ
stomach	3. Stomach emptying		LGIS	MCQ
	4. Role of pyloric pump			VIVÀ
	Discuss role of pyloric sphincter	C2	1	
	Describe the secretion of gastric juice.	C1		
	a. Describe the basic mechanism of HCl secretion.			
	b. Describe the secretion and activation of pepsinogen			
Gastric juice-I and	c. Describe the secretion of intrinsic factor			
Digestion in stomach	d. Describe the secretion of mucous and gastrin			SEQ
Physiological barrier	e. Describe the regulation of gastric acid and pepsinogen secretion		LGIS	MCQ
protecting	<ul> <li>Summarize the digestive process occurring in stomach</li> </ul>	C1	]	VIVA
development of peptic ulcer	<ul> <li>Discuss the role of gastric juice, hormones and enzymes acting in stomach</li> </ul>	C2		
• •	Discuss sites, causes and physiological factors preventing peptic	C2	-	
	ulcer	C1		
Liver & gall bladder,	Recall physiological anatomy of liver & portal circulation	C1	LGIS	SEQ
liver and biliary	• Describe in detail metabolic and non metabolic functions of liver	CI	LOIS	MCQ
secretions	• Explain the mechanism of secretion of bile.	C2	-	VIVA
Scoretions	• Explain the functions of biliary tree.	C2	-	V I V I I
	Describe the composition of bile.	C1	-	
	• Explain the role of bile in fat digestion.	C2	-	
	• Explain the formation of gall stones.	C2	-	
	• Enlist liver functions test	C1		SEQ
LFTs and jaundice	Describe liver function tests	C1	LGIS	MCQ
J	Discuss in detail pathophysiology of jaundice	C2	1	VIVA
	Describe causes and effects of cirrhosis	C1		SEQ
Cirrhosis & portal hypertension	• Describe causes and effects of portal hypertension	C1	LGIS	MCQ VIVA
Physiology of	Discuss composition of pancreatic secretions	C2		SEQ
pancreas Pancreatic	Describe mechanism of secretion of bicarbonate ions	C1	LGIS	MCQ
secretions		C1		VIVA
	Describe the regulation and phases of pancreatic secretion.	CI		. –

• Enumerate dietary sources of carbohydrates	C1	

	Describe the structure of villi.	C1		
Digestion and	• Enumerate the features of small intestine which increase its surface	C1		
Absorption –I	area			
(digestion and	• Explain in detail mechanism of absorption of fluids, ions &	C2		SEQ
absorption of	carbohydrates		LGIS	MCQ
carbohydrates and	• Enumerate dietary sources of proteins.	C1		VIVA
proteins )	Describe the role of hydrolysis in digestion of food.	C1	]	
	• Explain in detail the digestion of proteins with emphasis on	C2		
	enzymes at relevant steps.			
	Describe the sites of absorption	C1		
Digestion and	Enumerate dietary sources of fats	C1		
absorption-II	• Explain in detail the digestion of lipids in relation to bile	C2		SEQ
(digestion and			LGIS	MCQ
absorption of				VIVA
lipids)		G1		
Movements &	Recall functions of large intestine	C1	LGIS	SEO
functions of large	Discuss in detail mixing and propulsive movements	C2	LGIS	SEQ MCQ
intestine (motor	Explain the role of Gastrocolic & Duodenocolic reflex in	C2		VIVA
functions of large	large intestine motility	C2	_	V 1 V 7 1
gut and defecation)	Enumerate causes of empty rectum	C1		
Flatus &	Explain defecation reflex, its importance and nervous control	C2		
constipation	Discuss composition of feces	C2		
-	• Enlist causes of flatus	C1		
	Discuss causes and effects of constipation	C2		
	• Explain the general principles of alimentary tract secretion	C2		
	• Enlist the stimuli for alimentary tract secretion	C1		SEQ
Hormones of GIT	Describe the basic mechanism of secretion by glandular cells	C1	LGIS	MCQ
	• Elaborate the role of autonomic stimulation on glandular secretion	C2		VIVA
	• Enlist types of movements of small intestine	C1		
Small intestine	Discuss in detail mixing contractions and propulsive movements	C2		
motility, Diarrhea, malabsorption & sprue, ulcerative	Describe peristaltic rush	C1	1.010	SEQ
	• Explain functions of ileocecal valve and feedback control of	C2	LGIS	MCQ
	ileocecal sphincter			VIVA
colitis and paralytic ilius	• Discuss causes, types and effects of diarrhea, malabsorption and	C2		
mus	sprue			

• Discuss causes and effects of Ulcerative colitis & paralytic ilius	C2	

### **Biochemistry Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Lecture Students Should Be Able To	Domain	Strategy	Tool
Introduction to	Understand metabolic pathways	C2		MCQs,
Carbohydrate	Discuss glucose entry into the cells	C2	LGIS	SAQs
metabolism				Viva
	• Explain types, reactions and regulation of Glycolysis	C2		MCQs,
Glycolysis and Fates	Describe fates of Pyruvate	C2	LGIS	SAQs
of Pyruvate	Explain related clinical disorders	C3		Viva
	Discuss substrates, reactions and regulation of Gluconeogenesis	C2		MCQs,
Gluconeogenesis			LGIS	SAQs
				Viva
	Explain the steps and regulation of glycogenesis and glycogenolysis	C2		MCQs,
Glycogen			LGIS	SAQs
metabolism				Viva
	Describe the metabolism of individual sugars	C2		MCQs,
Metabolism of	Explain related clinical disorders	C3	LGIS	SAQs
Individual Sugars				Viva
	Explain the pathway of HMP shunt	C2		MCQs,
HMP Shunt and	Discuss uses of NADPH	C2	LGIS	SAQs
G6PD deficiency	Describe G6PD deficiency	C3		Viva
	Describe the composition and role of digestive juices	C2		MCQs,
GIT Digestive juices	Explain role of gastrointestinal hormones	C2	LGIS	SAQs
and Hormones	Understand related clinical disorders	C3		Viva
	Understand BMI and BMR	C2		MCQs,
Nutrition	Explain the role of different dietary constituents	C2	LGIS	SAQs
	Understand related clinical disorders	С3		Viva
	Discuss Liver function tests and Jaundice	C3		MCQs,
LFTs and Jaundice			LGIS	SAQs

				Viva
	Explain the digestion and absorption of carbohydrates, lipids and	C2		MCQs,
Digestion and	proteins		LGIS	SAQs
Absorption	Discuss the role of different digestive enzymes	C2		Viva
	Describe related clinical disorders	C3		

### **Anatomy Small Group Discussion (SGDs)**

Topic	Learning Objectives Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
	Enlist components of gastrointestinal tract	C1		
	Mark the planes dividing the abdomen into nine quadrants	P		
Topographical	Enumerate the parts of GIT lying in the various quadrants	C1	]	SAQ
	Correlate with the clinical conditions	C3		MCQ
organization of	Understand curative and preventive heath care measures.	C3	Skill lab	VIVA
Gastrointestinal	Practice the principles of bioethetics	C3		OSPE
tract	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Define the boundaries of oral cavity	C2		
	Tabulate the Extrinsic and Intrinsic muscles of the tongue,	C2		
	anatomical location and clinical importance of tongue			
Oral Cavity,	Brief Introduction of salivary glands with their anatomical	C1	]	SAQ
tongue and	location			MCQ
salivary glands,	Correlate with the clinical conditions	C3	Skill lab	VIVA
	Understand curative and preventive heath care measures.	C3		OSPE
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Explain the layers of abdominal wall.	C2		
	Explain the fascia and muscles of abdominal wall.	C2	=	
	Describe nerve supply of anterior and lateral abdominal wall.	C2	=	SAQ
	Explain the segmental sympathetic supplies	C2	Skill lab	MCQ
Anterolateral	Abdominal Hernias	C1	1	VIVA
abdominal wall	Correlate with the clinical conditions	C3		OSPE
	<ul> <li>Understand curative and preventive heath care measures.</li> </ul>	C3		
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		

	Use of HEC digital library	C3		
	Describe Formation of rectus sheath	C2		
	Enlist contents of rectus sheath	C2		
	Discuss associated clinical anatomy	C2	1	
	• Correlate with the clinical conditions	C3		
Rectus sheath,	• Understand curative and preventive heath care measures.	C3		SAQ
	• Practice the principles of bioethetics	C3	Skill lab	MCQ
	• Apply strategic use of A.I in health care	C3		VIVA
	Read relevant research articles	C3		OSPE
	Use of HEC digital library	C3		
	,	C3		
	Describe Walls of Inguinal Canal	C2		
	Explain Deep & Superficial Inguinal Ring	C2		
	Enumerate Structures passing through the inguinal canal	C1		
	Enlist Coverings of spermatic cord	C1		
	Explain Mechanics of the inguinal Canal	C2		
Inguinal Region	Describe boundaries of Hassalbachs triangle	C2		
& Inguinal	Define hernia	C1		SAQ
Hernias	Differentiate indirect from direct inguinal hernia	C3		MCQ
	Map outline of inguinal canal on simulated patient /model	P+A	Skill lab	VIVA
	Correlate with the clinical conditions	C3		OSPE
	• Understand curative and preventive heath care measures.	C3		
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library			
	Define Anatomy of Testes and Scrotum	C1		
	Differentiate between Protective Coverings of Testes & scrotum	C2		
	Enumerate Nerve & blood supply of these Structures	C1		SAQ
Testes, scrotum	Discuss the parts of epididymis	C2	]	MCQ
	Discuss Spermatocoele, Varicocoele, Hematocoele, hydrocoele,	C2	Skill lab	VIVA
	Testicular torsion			OSPE
	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures.	C3		
	Practice the principles of bioethetics	C3		

	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	, , , , , , , , , , , , , , , , , , ,	C3		
	Define peritoneum	C1		
	• Explain the different folds of peritoneum.	C2		
	Describe greater and lesser sacs	C2	_	640
Peritoneum &	Enlist the intra and retroperitoneal viscera	C1		SAQ MCQ
Peritoneal	Discuss vertical tracings of peritoneum	C2	Skill lab	VIVA
Cavity	Correlate with the clinical conditions	C3	SKIII Ido	OSPE
Cavity	• Understand curative and preventive heath care measures.	C3		OSIL
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Describe arrangement of peritoneum in transverse & Longitudinal	C2		
	section of abdomen			
	Describe arrangement of peritoneum in transverse section of male	C2		
	pelvis			SAQ
Subdivisons of	• Explain arrangement of peritoneum in transverse section of female	C2	Skill lab	MCQ
Peritoneal	pelvis			VIVA
Cavity	• Explain the layers, folds, recesses and compartments of	C2		OSPE
	peritoneum with their clinical importance			
	Describe peritonitis	C2		
	• Enumerate the signs and symptoms of peritonitis	C3		
	Treat peritonitis by antibiotics and peritoneal dialysis	C3		
	Correlate with the clinical conditions	C3		
	• Understand curative and preventive heath care measures.	C3		
	Practice the principles of bioethetics	C3		
	• Apply strategic use of A.I in health care	C3		
	<ul> <li>Read relevant research articles</li> </ul>	C3		
	Use of HEC digital library	C3		
Esophagus	Discuss gross features of abdominal part of esophagus	C2		
	Enumerate their peritoneal & visceral relations.	C1		SAQ
	Explain blood supply, lymphatic drainage & nerve supply of	C2	Skill lab	MCQ
	esophagus			VIVA

	<ul> <li>Discuss Esophageal varices</li> <li>Correlate with the clinical conditions</li> </ul>	C2 C3		OSPE
	<ul> <li>Understand curative and preventive heath care measures.</li> </ul>	C3		
		C3		
		C3		
	<ul> <li>Apply strategic use of A.I in health care</li> <li>Read relevant research articles</li> </ul>	C3		
		C3		
	Use of HEC digital library  - Explain gross features of stomach	C2		
	• Explain gross features of stomach.	C2	-	SAQ
	• Discuss blood supply, lymphatic drainage & nerve supply of	C2		MCQ
	stomach	CO	Skill lab	VIVA
Stomach	Explain peritoneal & visceral relations of stomach	C2	- Skill lab	OSPE
Stomach	Discuss greater and lesser omentum	C2		OSIL
	Describe formation and boundaries of epiploic foramen	C2		
	Map outline of stomach on simulated patient /model	P+A		
	Correlate with the clinical conditions	G2		
	• Understand curative and preventive heath care measures.	C3		
	• Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Describe the different parts ofduodenum with their anatomical differences	C2		
	Enumerate the relations of different parts of duodenum	C1	1	
Small Intestine	Discuss its clinical importance	C2	-	SAQ
(Duodenum)	<ul> <li>Map outline of duodenum on simulated patient /model</li> </ul>	P+A		MCQ
	Correlate with the clinical conditions	C3	Skill lab	VIVA
	<ul> <li>Understand curative and preventive heath care measures.</li> </ul>	C3		OSPE
	<u>-</u>	C3		
	Practice the principles of bioethetics     Apply strategie was of A Lin bastleh care.	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library			
	Describe jejunum and ileum with their anatomical features	C2		
	Discuss mesentery and its attachment	C2		
	Discuss its clinical importance	C2	]	
		C3		SAQ

Small Intestine	Correlate with the clinical conditions	C3		MCQ
(Jejunum and	• Understand curative and preventive heath care measures.	C3	Skill lab	VIVA
Ileum)	Practice the principles of bioethetics	C3		OSPE
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library			
	Enlist various parts of large intestine	C1		
	• Demonstrate gross anatomical features of different parts of large intestine	C2		
	Enlist intra and retroperitoneal parts of large intestine	C1		SAQ
Large Intestine	Discuss gross features of caecum	C2	G1 '11 1 1	MCQ
& Appendix	Describe gross anatomy of appendix	C2	Skill lab	VIVA
	• Enlist different anatomical positions of vermiform appendix.	C1		OSPE
	Mark McBurney's point	P		
	Demonstrate McBurney's incision	P		
	Discuss common features, differential diagnosis of acute	C3		
	appendicitis and appendicectomy			
	Map outline of Transverse and descending colon on simulatrs	P+A		
	patient /model	C3		
	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures.    Description   Descript	C3		
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles     Head HEC divided library	C3		
	<ul> <li>Use HEC digital library</li> <li>Describe the anatomical structure of liver.</li> </ul>	C2		
			_	
	Describe the lobes, surfaces and segments of liver	C2 C2	Skill lab	SAQ
	Describe peritoneal reflections, ligaments and bare area of liver.	_		MCQ
Liver, Portal	• Enumerate visceral relations of liver.	C1	_	VIVA
hypertension,	• Enlist the structures in porta hepatis.	C1	<u> </u>	OSPE
Portosystemic Anastomosis	Discuss Sub hepatic abscess & Live Biopsy	C2		
	Discuss formation, course and parts of portal vein	C2	_	
	Enumerate relations and tributaries of portal vein	C1	_	
	Define portal hypertension	C1		
	Describe sites of the portocaval anastomosis and their clinical	C2		

	significance			
	Explain role of portocaval shunts	C2		
	Map outline of liver on simulated patient /model	P+A		
	Correlate with the clinical conditions	C3		
	• Understand curative and preventive heath care measures.	C3		
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use HEC digital library	C3		
		C3		
	Describe location & size of gall bladder	C2		
	Enumerate relations of gallbladder.	C1		
	Describe clinical conditions related to gallbladder	C2		
	Enlist different components of Extra-hepatic biliary System	C1		
	• Discuss the right & left hepatic ducts, common hepatic duct, cystic	C2		
	ducts, bile duct			SAQ
	Explain differences between Intra & Extra Hepatic Biliary	C2		MCQ
Gallbladder and	Systems.		Skill lab	VIVA
Biliary apparatus	Discuss clinicals related with biliary apparatus	C2		OSPE
	Discuss accessory hepatic ducts	C2		
	Map outline of gallbladder & Bile duct on simulated patient	P+A		
	/model			
	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures.	C3		
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use HEC digital library			
	Discuss anatomical location and features of spleen with its blood	C2		
	supply, and lymphatic drainage			
	Explain Rupture of spleen & its effects	C2		
	Map outline of spleen on simulated patient /model	P+A		SAQ
Spleen	Correlate with the clinical conditions	C3	Skill lab	MCQ
	<ul> <li>Understand curative and preventive heath care measures.</li> </ul>	C3		VIVA
	<ul> <li>Practice the principles of bioethetics</li> </ul>	C3		OSPE
	- Tractice the principles of blochicues	<u> </u>		

	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Recall location, shape, dimensions and extent of pancreas	C2		
	Discuss parts, ducts and relations of pancreas	C2	]	
	Describe arterial supply of pancreas	C2	]	SAQ
	Explain applied aspects of pancreas	C2	]	MCQ
D	Map outline of pancrease on simulated patient/ model	P+A	Skill lab	VIVA
Pancreas	Correlate with the clinical conditions	C3		OSPE
	Understand curative and preventive heath care measures.	C3		
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Describe the position and the vertebral levels of aorta in the	C2		
	abdomen.		_	
	• Enlist the main branches of the aorta and its territories.	C1	]	
	Explain the applied anatomy of the aorta	C1		SAQ
Vasculature of	• Explain origin, course, branches and distribution of celiac trunk	C2	Skill lab	MCQ
GIT	Map outline of abdominal aorta, coeliac trunk, superior &inferior	P+A		VIVA
	mesenteric artery on simulated patient/ model	C3		OSPE
	Correlate with the clinical conditions	C3		
	Understand curative and preventive heath care measures.	C3		
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library			
	Discus enteric nervous system with formation of plexuses and its	C2		
	parasympathetic role		_	
	Enlist the types of lymph nodes draining the abdomen	C1	]	
	Describe lymphatic drainage of GIT with special reference to	C2		SAQ
Nerve supply	lymphatic trunks, cisterna chyli & the thoracic duct		Skill lab	MCQ
and Lymphatic	Correlate with the clinical conditions	C3		VIVA
drainage of GIT	Understand curative and preventive heath care measures.	C3		OSPE
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		

	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Identify different visceras located at different levels of vertebral	C1		
	coloumn; T10,T11,T12,L1,L2			
	Correlate with the clinical conditions	C3		SAQ
Cross Sectional	<ul> <li>Understand curative and preventive heath care measures.</li> </ul>	C3	Skill lab	MCQ
Anatomy	Practice the principles of bioethetics	C3		VIVA
	Apply strategic use of A.I in health care	C3		OSPE
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
	Discuss the location and extent of rectum	C2		
	Describe the internal and external features of rectum	C2		
Rectum	Discuss peritoneal reflections rectouterine, rectovesical fossae and	C2		SCQ
	their clinical significance		Skill lab	MCQ
	Enumerate relations of rectum	C1		VIVA
	Discuss blood supply, nerve supply, venous and lymphatic	C1		OSPE
	drainage			
	Describe the basis and features of rectal prolapsed	C3		
	Correlate with the clinical conditions	C3		
	<ul> <li>Understand curative and preventive heath care measures.</li> </ul>	C3		
	Practice the principles of bioethetics	C3		
	Apply strategic use of A.I in health care	C3		
	Read relevant research articles	C3		
	Use of HEC digital library	C3		
Anal canal	Discuss location and extent of anal canal	C2	Skill lab	SAQ
	Describe external and internal features of Anal Canal	C2		MCQ
	Discuss features of anal sphincters	C2	]	VIVA
	Tabulate relations of the anal canal with the surrounding structures	C2		OSPE
	Describe the Blood supply, venous and lymphatic drainage &	C2		
	innervations of anal canal			
	Discuss anal continence	C2		
	Differentiate between internal and external haemorrhoids	C3	1	
	Correlate with the clinical conditions	C3		
	<ul> <li>Understand curative and preventive heath care measures.</li> </ul>	C3		
	<ul> <li>Practice the principles of bioethetics</li> </ul>	C3		
	r	C3		

	<ul> <li>Apply strategic use of A.I in health care</li> <li>Read relevant research articles</li> <li>Use of HEC digital library</li> </ul>	C3 C3		
Radiological Anatomy	<ul> <li>Identify structures on a normal X-ray abdomen</li> <li>Appreciate Air fluid shadows.</li> <li>Mark anatomical landmarks.</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply Strategic use of AI in health care</li> <li>Read relevant research articles</li> </ul>	C2 C2 C2 C3 C3 C3 C3 C3 C3	Skill lab	OSPE

## **Physiology Small Group Discussion (SGDs)**

Topic	Learning Objectives		Teaching	Assessment
	Students Should Be Able To	Domain	Strategy	Tools
	Enlist general four functions performed by GIT	C1		
Introduction to	<ul> <li>Recall physiological anatomy and blood flow through GIT</li> </ul>	C1		SEQ
GIT	Briefly discuss electrical activity of GIT smooth muscle	C1	SGD	MCQ VIVA
	Discuss in detail the three stages of swallowing	C2		SEQ
Swallowing	Briefly discuss physiological anatomy of lower esophageal	C2	SGD	MCQ
	sphincter and distal end of esophagus and state their			VIVA
	functional importance			
	Recall physiological anatomy of stomach	C1		SEQ
	Describe motor functions of stomach including storage, mixing,			MCQ
Functions of	propulsion and stomach emptying.		SGD	VIVA
stomach	Discuss in detail gastric factors that promote emptying	C2		
	Explain the role of enterogastric nervous reflexes and	C2		
	hormonal feedback.			
	Recall physiological anatomy of liver	C1		SEQ
Liver functions	Discuss formation and storage of bile		SGD	MCQ
	Enlist and describe all functions performed by liver	C1		VIVA
	• Describe in detail the process of digestion of carbohydrates,	C1		

Digestion and absorption	proteins and fats with special emphasis on enzymes involved at each step		SGD	SEQ MCQ
	Discuss special features of small and large intestine to promote	C2		VIVA
	absorptive process and mechanism of absorption in detail			
	Recall movements and functions of large intestine	C1		
	Enumerate causes of empty rectum	C1		
Large intestine	Explain defecation reflex, its importance and nervous	C2		SEQ
	control		SGD	MCQ
	Explain GIT reflexes integrated at the level of gut wall,	C2		VIVA
	prevertebral sympathetic ganglia and spinal cord/brain stem.			

### **Biochemistry Small Group Discussion (SGDs)**

Topic	Learning Objectives		Teaching	Assessment
	Students Should Be Able To	Domain	Strategy	Tool
	<ul> <li>Explain formation, composition &amp; biochemical functions</li> </ul>	C2		MCQs
Saliva			SGD	SAQs
				Viva
Gluconeogenesis &	<ul> <li>Discuss substrates, reactions and regulation of</li> </ul>	C2		MCQs
its regulation	Gluconeogenesis		SGD	SAQs
-				Viva
	<ul> <li>Discuss Liver function tests and Jaundice</li> </ul>	C3		MCQs
LFT's Jaundice			SGD	SAQs
				Viva

### **Anatomy Self Directed Learning (SDL)**

<b>Topics of SDL</b>	Learning Objectives Students Should Be Able To		Learning Resources
Antero lateral abdominal wall,	<ul> <li>Explain the layers of abdominal wall.</li> <li>Explain the fascia and muscles of abdominal wall.</li> <li>Describe nerve supply of anterior and lateral abdominal wall.</li> <li>Explain the segmental sympathetic supplies</li> </ul>	*	Clinical Oriented Anatomy by Keith L. Moore.7 <sup>TH</sup> Edition. (Chapter 2, Page 183,184-216). https://3d4medical.com/
Rectus sheath	<ul> <li>Describe Formation of rectus sheath</li> <li>Enlist contents of rectus sheath</li> </ul>	<b>*</b>	Clinical Oriented Anatomy by Keith L. Moore.7 <sup>TH</sup> Edition. (Chapter 2, Page 188-201). https://teachmeanatomy.info/
Inguinal region & Hernias	<ul> <li>Describe Walls &amp; detailed anatomy of Inguinal Canal</li> <li>Explain Deep &amp; Superficial Inguinal Ring</li> <li>Associated Clinicals</li> </ul>	<b>*</b>	Clinical Oriented Anatomy by Keith L. Moore.7 <sup>TH</sup> Edition. (Chapter 2, Page 197, 202-203, 212-213). https://3d4medical.com/
Peritoneum & Peritoneal Cavity.	<ul> <li>Define peritoneum</li> <li>Explain the different folds of peritoneum.</li> <li>Describe greater and lesser sacs</li> <li>Enlist the intra and retroperitoneal viscera</li> <li>Discuss vertical tracings of peritoneum</li> <li>Describe arrangement of peritoneum in transverse &amp; Longitudinal section of abdomen</li> <li>Describe arrangement of peritoneum in transverse section of male pelvis</li> <li>Explain arrangement of peritoneum in transverse section of female pelvis</li> <li>Explain the layers, folds, recesses and compartments of peritoneum with their clinical importance</li> <li>Describe peritonitis</li> <li>Enumerate the signs and symptoms of peritonitis</li> <li>Treat peritonitis by antibiotics and peritoneal dialysis</li> </ul>	*	Clinical Oriented Anatomy by Keith L. Moore.7 <sup>TH</sup> Edition. (Chapter 2, Page 219-221,). https://teachmeanatomy.info/
	Describe the different parts of duodenum with their	*	Clinical Oriented Anatomy by Keith L.

Small Intestine	<ul> <li>anatomical differences</li> <li>Enumerate the relations of different parts of duodenum</li> <li>Discuss its clinical importance</li> </ul>		Moore.7 <sup>TH</sup> Edition. (Chapter 2, Page 239, 241, 244, 245, 325, 436). https://www.kenhub.com/en/library/anatomy/the-digestive-system	
Large Intestine	Anatomy of Jejunum & Ileum     Faliat various mosts of large intesting.		e-digestive-system	
Large Intestine	<ul> <li>Enlist various parts of large intestine</li> <li>Demonstrate gross anatomical features of different parts of large intestine</li> </ul>	*	Clinical Oriented Anatomy by Keith L. Moore.7 <sup>TH</sup> Edition. (Chapter 2, Page	
	Enlist intra and retroperitoneal parts of large intestine	*	227,246,248, 325). https://www.kenhub.com/en/library/anatomy/the-digestive-system	
	Describe formation of hepatic diverticulum	*	Clinical Oriented Anatomy by Keith L.	
	Describe histogenesis of liver during intrauterine life		Moore.7 <sup>TH</sup> Edition. (Chapter 2, Page 267-268,	
I irran and	Describe formation of various ligaments of liver.		272-278, 282,323, 395).	
Liver and	Discuss congenital abnormalities of liver	*	https://www.kenhub.com/en/library/anatomy/the-digestive-system	
pancreas	Differentiate between exocrine and endocrine pancreas.		e-digestive-system	
	• Discuss the cellular structure and function of exocrine pancreatic acinus and ducts.			
	Explain the applied anatomy of the aorta	*	Clinical Oriented Anatomy by Keith L.	
Vasculature of	Explain origin, course, branches and distribution of celiac trunk		Moore.7 <sup>TH</sup> Edition. (Chapter 2, Page 228-233, 249-250, 263-285).	
GIT (Blood	Discuss formation, course and parts of portal vein	*	http://www.anatomyzone.com 3D <b>anatomy</b>	
Supply, Venous	Enumerate relations and tributaries of portal vein			
drainage,	Define portal hypertension			
Lymphatic drainage)	Discuss Major Lymphatic Channels			
urumugu)	Discuss the location and extent of rectum	*	Clinical Oriented Anatomy by Keith L.	
	Describe the internal and external features of rectum		Moore.7 <sup>TH</sup> Edition. (Chapter 2, Page 239,	
	• Discuss peritoneal reflections rectouterine, rectovesical fossae and their clinical significance	*	248,253 368-371,436,438). http://www.anatomyzone.com 3D <b>anatomy</b>	
	Enumerate relations of rectum			
Rectum & Anal Canal	• Discuss blood supply, nerve supply, venous and lymphatic drainage			
	Describe the basis and features of rectal prolapsed			
	Discuss location and extent of anal canal			
	Describe external and internal features of Anal Canal			
	Discuss features of anal sphincters			

	Tabulate relations of the anal canal with the surrounding structures		
	• Describe the Blood supply, venous and lymphatic drainage & innervations of anal canal		
	Discuss anal continence		
	Differentiate between internal and external hemorrhoids		
Innervation of	Discuss cutaneous & Somatic innervation of GIT		linical Oriented Anatomy by Keith L.
Abdominal	Describe Autonomic innervation of GIT		Ioore.7 <sup>TH</sup> Edition. (Chapter 2, Page 301-305).
Viscera's		ht	tp://www.anatomyzone.com 3D <b>anatomy</b>

## **Physiology Self Directed Learning (SDL)**

Topics Of SDL	Learning Objectives Students Should Be Able To	Learning Resources
Introduction to GIT, electrical activity in GIT, Enteric Nervous System and GIT reflexes	<ul> <li>Introduction</li> <li>Role of GIT in control system</li> <li>Concept of Enteric nervous system</li> <li>GIT reflexes and its clinical correlation</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Overview of gastrointestinal function andregulation (Chapter 25, Page 453,467,472).</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. The Digestive System (Chapter 21Page 691,700)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Gastrointestinal Physiology (Chapter 8. Page 339)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 6.Gastrointestinal System. (Chapter 43, Page 681)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Gastrointestinal Physiology. Section 12. (Chapter 63, Page 787)</li> </ul>
Gastric secretion, digestion in stomach, peptic ulcer and gastritis	<ul> <li>Gastric secretion and role in digestion</li> <li>Peptic ulcer disease</li> <li>Type of gastritis and clinical importance of gastritis</li> <li>Investigations to diagnose gastritis</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology. Overview of gastrointestinal function and regulation(Chapter 25, Page 455).</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Gastrointestinal Physiology (Chapter 8. Page 356,360)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 6. Gastrointestinal System. (Chapter 44, Page 706) (Chapter 45, Page 720,726)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Gastrointestinal Physiology.</li> <li>Section 12. (Chapter 65, Page 809,811)</li> </ul>

Small intestine motility and malabsorption (sprue, paralytic ileus and Crohn's disease)	<ul> <li>Factors affecting motility of smallintestine</li> <li>Concept of absorption of nutrients</li> <li>Importance of history in diagnosis of various malabsorption diseases</li> <li>Inflammatory bowel disease</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition,         Gastrointestinal motility. (Chapter 27,Page 495)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. The         Digestive System (Chapter 21,Page 697)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Gastrointestinal Physiology         (Chapter 8. Page 348)</li> <li>Physiological Basis of Medical Practice by Best &amp;         Taylor's.13<sup>th</sup> Edition. Section 6.Gastrointestinal System.         (Chapter 44,Page 690,710)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.         Gastrointestinal Physiology.Section 12. (Chapter 64, Page 797,802)</li> </ul>
Intestinal secretion and its functions, pancreatic juice, its composition and functions	<ul> <li>Intestinal secretions and action</li> <li>Anatomy of pancreas and its blood supply</li> <li>Composition of pancreatic juice and itsrole in absorption</li> <li>Function of pancreas</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Overview of gastrointestinal function andregulation (Chapter 25,Page 460).</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. The Digestive System (Chapter 21,Page 709)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Gastrointestinal Physiology (Chapter 8. Page 366,371)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 6.Gastrointestinal System. (Chapter 45,Page 738,739)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Gastrointestinal Physiology.Section 12. (Chapter 65,Page 814,820)</li> </ul>
Pancreatitis, overall mechanism of digestion and absorption of intestine (amino acids, fatty acids and glucose)	<ul> <li>Pancreatitis</li> <li>Conclusion of digestion and absorption ofnutrients.</li> <li>Clinical correlation with pancreaticenzymes.</li> <li>Hormones secreted by pancreas</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Digestion, Absorption and NutritionalPrinciples. (Chapter 2, Page 475)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. The Digestive System (Chapter 21,Page 703-710,715)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Gastrointestinal Physiology (Chapter 8. Page 374)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 6.Gastrointestinal System. (Chapter 47,Page 770)(Chapter 48,Page 785)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Gastrointestinal Physiology.Section 12. (Chapter 66, Page 823)</li> </ul>

	·		
	<ul> <li>Motor function of large gut</li> </ul>	*	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition,
	<ul> <li>Inflammatory bowel disease</li> </ul>		Gastrointestinal motility. (Chapter 27, Page 495)
Motor function of	Defecation reflex	*	Human Physiology by Dee Unglaub Silver thorn. 8 <sup>TH</sup> Edition. The
large gut, defecation	Concept of Hemorrhoids		Digestive System (Chapter 21, Page 720)
reflex		*	Physiological Basis of Medical Practice by Best &
			Taylor's.13 <sup>th</sup> Edition. Section 6.Gastrointestinal System.
			(Chapter 44,Page 713)
		*	
			Gastrointestinal Physiology. Section 12. (Chapter 64, Page 804)
Pathophysiology	Symptomsrelated to GIT	*	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition, Gastrointestinal
(vomiting, diarrhea,	<ul> <li>Clinical role of various symptoms</li> </ul>		motility. (Chapter 27, Page 495)
constipation,	<ul> <li>Overview of Carcinoma of stomach,</li> </ul>	*	Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition. Gastrointestinal Physiology
ulcerative colitis,	smalland large intestine		(Chapter 8. Page 385)
megacolon and		*	
carcinoma of colon)			Gastrointestinal Physiology. Section 12. (Chapter 67, Page 833)

### **Biochemistry Self Directed Learning (SDL)**

Topics of SDL	Learning Objectives Students Should Be Able To	References
Carbohydrate Metabolism & Glycolysis	<ul> <li>Understand stages of metabolism</li> <li>Explain transport of glucose across cell memebrane</li> <li>Describe steps of glycolysis</li> <li>Discuss regulation of committed steps</li> <li>Explain energy calculation in anaerobic and aerobic conditions</li> <li>Understand pyruvate kinase deficiency</li> </ul>	❖ Reference Book: Lippincott's Illustrated reviews of Biochemistry 8th Edition Chapter#8, Page 100.
TCA Cycle & Gluconeogenesis	<ul> <li>Describe steps of TCA cycle</li> <li>Discuss substrates, steps and regulation of gluconeogenesis</li> </ul>	<ul> <li>Reference Book: Lippincott's Illustrated reviews of Biochemistry 8th Edition Chapter#9, Page 120.</li> <li>Reference Book: Lippincott's Illustrated reviews of Biochemistry 8th Edition Chapter#10, Page 128.</li> </ul>
Glycogen metabolism	<ul><li>Explain synthesis and breakdown of glycogen</li><li>Discuss glycogen storage diseases</li></ul>	❖ Reference Book: Lippincott's Illustrated reviews of Biochemistry 8th Edition Chapter#11, Page 137.
Individual Sugars	<ul> <li>Descibe the metabolism of individual sugar</li> <li>Explain related clinal disorder</li> </ul>	<ul> <li>Essentials of Medical Biochemistry Book by Mushtaq Ahmed Edition 9th Volume#1, Chapter#7, Page 186</li> <li>Reference Book: Lippincott's Illustrated reviews of Biochemistry 8th Edition Chapter#19, Page 276, 77.</li> </ul>

Digestion of Lipids by	•	Explain the digestion and absorption of lipids	*
Pancreatic Enzymes	•	Discuss the role of pancreatic enzymes in lipid digestion	

### **Histology Practicals Skill Laboratory (SKL)**

Topic	At the end of practical students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
	Identify slidesof tongue & glands under microscope	P		
Tongue & salivary	• Illustrate histological structure of tongue & salivary glands	C2	Skill lab	OSPE
glands	Write two points of identification	C1		
	Identify slide of Esophagus under microscope	P		
Esophagus	Illustrate histological structure of Esophagus	C2	Skill lab	OSPE
	Write two points of identification	C1		
	Identify slide of Stomach under microscope	P		
	Illustrate histological structure of Stomach	C2		OSPE
Stomach	Write two points of identification	C1	Skill lab	
	Differentiate mucosa of cardiac, fundus, body and pyloric end of stomach	C2		
Liver, Gall bladder	Identify slides of Liver, Gall bladder &Pancreas under microscope	P		
& Pancreas	Illustrate histological structures of Liver, Gallbladder & Pancreas	C2	Skill labs	OSPE
	Write two points of identification	C1		
	Identify slide of small intestine under microscope	P		
Small Intestine	Illustrate histological structure of small intestine	C2	Skill lab	OSPE
	Write two points of identification	C1		
	Identify slide of Large Intestine under microscope	P		
Large Intestine	Illustrate histological structure of large intestine	C2	Skill lab	OSPE
	Write two points of identification	C1		

### **Physiology Practicals Skill Laboratory (SKL)**

Topic	At the end of this skill lab, student	Learning	Teaching	Assessment
	should be able to illustrate:	Domain	Strategy	Tool
	Apparatus identification	P		
	Principle	C1		
Sense of taste	Procedure	P	Skill lab	OSPE
	• Precautions C1			
	• Recall taste modalities, taste pathway & abnormalities of taste	C1		
	Apparatus identification	P		
	Principle	C1		
Examination of	Procedure	P	Skill lab	OSPE
sense of smell	• Precautions	C1		
	Recall Olfactory pathways and     C1			
	abnormalities of olfaction			
	Apparatus identification	C1		
	Principle	C1		
Examination of	Procedure	A,P		
superficial reflexes	• Precautions	P	Skill lab	OSPE
	Recall reflex arc	C1		
	Recall effects of UMNL & LMNL on	C1		
	reflexes			
	Apparatus identification	C1		
	Principle	C1		
Examination of deep reflexes	Procedure	A,P	Skill lab	OSPE
	Precautions	P		
	Recall reflex arc	C1		
	Recall effects of UMNL & LMNL on reflexes	C1		

### **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	At the End of Practical Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
Saliva-I	<ul> <li>Understand Normal constituents of saliva Discuss effects of saliva on digestion of starch</li> </ul>	P	Skill Lab	OSPE
	Discus the role of silva in digestion of carbohydrates	P		
Silva-II	, and the second		Skill Lab	OSPE
Bile	Descirbe the composition and role of bile in disgestion	P	Skill Lab	OSPE
	Understand related disorder			
Estimation of ALT & ALP	<ul> <li>Perform estimation of ALT</li> </ul>	P	Skill Lab	OSPE
	<ul> <li>Perform estimation of ALP</li> </ul>			
Analysis of Food	Perform to analyse the different constituents of wheat	P	Skill Lab	OSPE
Component (Wheat)	•			

#### **Orientation Sessions of Medical Education**

#### Content

- Orientation Session on Curricular Reform RMU & Feedback of Year 2023
- Student Session on Standardization of Teaching Strategies

# **Department of Medical Education**

Topic	Learning Objectives		Assessment
	At the end of the lecture the student should be able to	Strategy	Tool
Orientation of Integrated Modular system, Intoduction to study guides and RMU Policies	<ul><li> Understand the concept of integration</li><li> Understand the orientation of integrated modular</li></ul>		
	<ul> <li>curriculum of RMU</li> <li>How to use Study Guides</li> <li>Introduction to different policies of RMU</li> </ul>	LGIS	MCQs
Standardization of Teaching Strategies	Discuss Standardization of Different Teaching Strategies used in Integrated Model of RMU.	LGIS	MCQs

### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

# **Basic and Clinical Sciences (Vertical Integration)**

### **Case Based Learning (CBL)**

Subject	Topic	At the End Of Lecture Students Should Be Able To	Learning Domain
	Acute Appendicitis	Apply basic knowledge of subject to study clinical case.	C3
Anatomy	Liver Cirrhosis	Apply basic knowledge of subject to study clinical case.	C3
	Peptic Ulcer	Apply basic knowledge of subject to study clinical case.	C3
Physiology	Food Poisoning	Apply basic knowledge of subject to study clinical case.	C3
	Glucose 6 Phosphate Dehydrogenase	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	Deficiency		
	Lactose Intolerance	Apply basic knowledge of subject to study clinical case.	C3

### **Large Group Interactive Sessions (LGIS)**

#### **Community Medicine**

Topic	At The End Of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
	By the end of the session students will be able to;	C1		
	• Define Health			
	• Identify different phases of Health	C1		MCQs
Concept of	• Elaborate concepts of Health	C2		
Health and	Acknowledge Dimensions of Health	C2	LGIS	
Disease	• Elucidate Dimensions of health	C2		
	Appreciate Determinants of Health	C2		
	Describe the types of determinants	C2		
	Infectious Disease Epidemiology			
Definitions	• Define important terms related to infectious disease epidemiology.	C1		

Epidemic, endemic and pandemic	Differentiate between epidemic, endemic and pandemic	C2	LGIS	MCQs
Dynamics of disease transmission	Describe the dynamics of transmission of disease	C2		
Incubation period	Explain the concept of incubation period and its importance.	C2		

#### Medicine

Topic	At the end of the lecture, students should be able	Learning	Learning	Assessment
	to	Domain	Strategy	Tools
	<ul> <li>Define and discuss pathophysiology</li> </ul>	C1		
Dysphagia	Discuss the causes	C2	LGIS	MCQs
	Describe clinical features	C2		
	Describe the management	C2		
	Describe Mechanism of digestion in stomach	C1		
	Describe Mechanism of APD and GERD	C2		
Peptic ulcer	Discuss Peptic ulcer formation	C2	LGIS	MCQs
	Enlist Clinical features	C2		
	Enlist Investigations	C1		
	Describe management	C2		
	Enlist types of Jaundice	C1		
	Discuss changes in Liver	C2		
Jaundice	Describe clinical features	C2	LGIS	MCQs
	Enlist investigations	C1		
	Discuss management	C2		
	Describe features of IBD	C2		
Inflammatory	Classify IBD	C2		
bowel disease	Describe pathogenesis of IBD	C2	LGIS	MCQs
	Describe histological diagnosis of IBD	C1		
	Enlist complication of IBD	C1		

### **List of GIT Module Basic and Clinical Sciences Vertical Integration Lectures**

Sr. #	Date/Day	Week	Time	Department	Topic of Lectures	Teacher's Name & Contact #
1.	29-02-2024 Thursday	1 <sup>st</sup> Week	09:20am- 10:10am	Community Medicine	Concept of health & disease (Even)	Dr. Rizwana Shahid 0320-5511684
					Epidemiology of infectious diseases & Basic Concepts (Odd)	Dr. Afifa kalsoom 0333-5506597
2.	01-03-2024	1st Week	10:00am-	Quran Translation	Imaniat I (Even)	Mufti Naeem Sherazi 03005580299
	Friday		11:00am		Ibadat I (Odd)	Dr Fahd 03005156800
3.	01-03-2024 Friday	1 <sup>st</sup> Week	11:00am- 12:00pm	Community Medicine	Epidemiology of infectious diseases & Basic Concepts (Odd)	Dr. Afifa kalsoom 0333-5506597
			_		Concept of health & disease (Even)	Dr. Rizwana Shahid 0320-5511684
4.	02-03-2024	1st Week	9:20am –	Behavioral Sciences	Eating Disorders	Dr. Sadia Yasir (Even)
	Saturday		10:10am			Dr. Zona Tahir (Odd)
5.	04-03-2024	2 <sup>nd</sup> Week	11:20am- 12:10pm	Bioethics & Research	Pakistan Medical & dental council Code of Ethics (even)	Dr. Sidra Hamid 0331-5025147
	Monday		_		Introduction to Descriptive Statistics (Odd)	Dr. Rizwana Shahid 0320-5511684
6.	08-03-2024	2 <sup>nd</sup> Week	08:00am-	Medicine	Peptic ulcer (Even)	Dr Javeria Khan 03345444083
	Friday		09:00am		Peptic ulcer (Odd)	Dr Anum Abbas 03455057646
7.	08-03-2024	2 <sup>nd</sup> Week	10:00am-	Quran Translation-II	Ibadat-II (Even)	Dr Fahd 03005156800
	Friday		11:00am		Imaniyat -II (Odd)	Mufti Naeem Sherazi 03005580299
8.	08-03-2024	2 <sup>nd</sup> Week	11:00am	Quran Translation-II	Ibadat-II (Even)	Mufti Naeem Sherazi 03005580299
	Friday		12:00pm		Imaniyat -II (Odd)	Dr Fahd 03005156800
9.	09-03-2024 Saturday	2 <sup>nd</sup> Week	9:20am – 10:10am	Radiology & Artificial Intelligence	Medical Imaging of abdomen-I	Dr. Quratul Ain (Even) Dr. Aneega Saleem (Odd)
10.	12-03-2024	3 <sup>rd</sup> Week	11:10am-	Research -I &	Introduction to descriptive	Dr. Rizwana Shahid 0320-5511684
10.	Tuesday	3 WEEK	11:10am 11:50am	Bioethics	statistics (Even)	Di. Kizwana Shanu 0320-3311004
	Tuesday		11.50am	Diocunes	Pakistan Medical & dental council	Dr. Sidra Hamid
					Code of Ethics (Odd)	Di. Statu Haima
11.	13-03-2024	3 <sup>rd</sup> Week	09:20am-	Research-II LGIS	Classification of different types of	Dr. Rizwana Shahid 0320-5511684
	Wednesday		10:10am		data	Dr.

12.	14-03-2024	3 <sup>rd</sup> Week	09:20am- 10:10am	Medicine	State of the Art Lecture Jaundice	Worthy Vice Chancellor Prof. Dr. Muhammad Umar
13.	Thursday 14-03-2024	3 <sup>rd</sup> Week	10.10am	Family Medicine	Common Abdominal diseases	Dr. Sadia
13.	Thursday	3 WEEK	11:50am	Talling Medicine	Common Abdommar diseases	Dr. Ishtiaq
	15-03-2024	3 <sup>rd</sup> Week	10:00am	Quran Translation-III	Ibadaat-3	Dr Fahd 03005156800 (Even)
14.	Friday	3 WEEK	11:00am	Quran Translation-III	Imaniat-3	Mufti Naeem Sherazi 03005580299 (Odd)
		and res		0 5 1 1 777		` '
15.	15-03-2024	3 <sup>rd</sup> Week	11:00am	Quran Translation-III	Imaniat-3	Mufti Naeem Sherazi 03005580299 (Even)
13.	Friday		12:00pm		Ibadaat-3	Dr Fahd 03005156800 (Odd)
	16-03-2024	3 <sup>rd</sup> Week	11:10am-	Pak Studies/Islamiyat	Tehreek-E-Pakistan Islaahi	Qari Aman Ullah 03467598528
16.	Saturday		11:50am		Tehreekain	
		.1			Akhirat-I	Mufti Naeem Sherazi 03005580299
	19-03-2024	4 <sup>th</sup> Week	10:30am-	Research-III	Scales of Data Measurement	Dr. Rizwana Shahid 0320-5511684
17.	Tuesday		11:10am			Dr. Afifa kalsoom 0333-5506597
						Dr. Ishtiaq
1.0	21-03-2024	4 <sup>th</sup> Week	11:10am-	Research-IV	Research IV: Measures of central	Dr. Rizwana Shahid 0320-5511684
18.	Thursday		12:00pm		Tendency	Dr. Afifa kalsoom 0333-5506597
	22-03-2024	4 <sup>th</sup> Week	08:00am-	Pak	Toheed	Mufti Naeem Sherazi 03005580299
19.	Friday		09:00am	Studies/Islamiyat-I	Qayam e Pakistan, Aghraaz o Maqasid	Qari Aman Ullah 03467598528
	22-03-2024	4 <sup>th</sup> Week	09:00am-	Pak	Qayam e Pakistan, Aghraaz o	Qari Aman Ullah 03467598528
20.	Friday		10:00am	Studies/Islamiyat-I	Maqasid	
	J				Toheed	Mufti Naeem Sherazi 03005580299
	22-03-2024	4 <sup>th</sup> Week	10:00am-	Entrepreneurship	Ideate Initial Idea	Dr. Asif Maqsood & Dr. Sidra Hamid
21.	Friday		11:00am			-
21.						
	23-03-2024	4 <sup>th</sup> Week	11:50am –	Pak Studies/Islamiyat	Tehreek-e-Aligarh, Sir Syed	Qari Aman Ullah (Even)
22.	Saturday	4 WEEK	01:00pm	Fak Studies/Islailityat	Ahmad Khan	Qari Aman Onan (Even)
22.	Saturday		01.00pm		Akhirat -II	Mufti Naeem Sherazi (Odd)
	27-03-2024	5 <sup>th</sup> Week	10:30am-	Research-V	Compute and Interpret measures of	
23.	Wednesday	J WOOK	11:10am	1100001011	central tendency	Dr. Afifa kalsoom 0333-5506597
	28-03-2024	5 <sup>th</sup> Week	10:30am-	Research-VI	Measures of dispersion/Secondary	Dr. Rizwana Shahid 0320-5511684
24.	Thursday	.,	11:10am	, ,	Data Analysis	Dr. Afifa kalsoom 0333-5506597
	29-03-2024	5 <sup>th</sup> Week	11:10am-	Radiology &	Medical Imaging of abdomen-II	Dr. Sana Yaqoob (Even) \
25.	Friday		11:50am	Artificial Intelligence		0342-2064666
						Dr. Saba Bint e Kashmir (Odd)

#### **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

#### Content

- Longitudinal Themes
  - o The Holy Quran Translation
  - o Biomedical Ethics & Professionlism
  - o Behavioural Sciences
  - o Family Medicine
  - o Artificial Intelligence (Innovation)
  - o Integrated Undergraduate Research Curriculum (IUGRC)
  - o Enterpeneurship
  - o Digital Literacy Module
  - o Early Clinical Exposure (ECE)

#### The Holy Quran Translation lecture

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessmen t Tool
Imaniyat (Faith)	<ul> <li>Introduction of concept of Imaniyat</li> <li>Corelate the concept of faith in different situation of life</li> </ul>	C2	LGIS	SAQ
Tauheed (Oneness of God)	<ul> <li>Introduction of Quranic Concept of Tauheed</li> <li>Corelate the concept of tauheed in different situation of life</li> </ul>	C2	LGIS	SAQ
Ibadaat (Worship)	<ul> <li>Introduction of concept of Ibadaat</li> <li>Study of Verses Related to Hajj</li> <li>Impact of Hajj on a Muslim's Life</li> </ul>	C2	LGIS	SAQ
Amr bil Ma'ruf and Nahi anil Munkar (Enjoining Good and Forbidding Evil)	<ul> <li>Introduction of concept of Amr bil Ma'ruf and Nahi anil Munkar</li> <li>Study of Verses Related to Amr bil Ma'ruf and Nahi anil Munkar</li> </ul>	C2	LGIS	SAQ
	• Importance of Amr bil Ma'ruf and Nahi anil Munkar in the life of medical doctors			

### Pak Studies/Islamiyat

Topic	Learning Objectives At the end of the lecture the student should be able to	Learnin g Domain	Teaching Strategy	Assessmen t Tool
Tehreek-E-Pakistan Islaahi Tehreekain	Understand the history of Tehreek-E-Pakistan Islaahi Tehreekain.	C2	LGIS	SAQ
Akhirat-I	<ul> <li>Introduction of Quranic Concept of Akhriat</li> <li>Corelate the concept of Akhriat in different situation of life</li> </ul>	C2	LGIS	SAQ
Qayam e Pakistan, Aghraaz o Maqasid	Understand the history of Qayam e Pakistan, Aghraaz o Maqasid Tehreek-E-Pakistan Islaahi Tehreekain.	C2	LGIS	SAQ
Toheed	<ul> <li>Introduction of Quranic Concept of Tauheed</li> <li>Corelate the concept of tauheed in different situation of life</li> </ul>	C2	LGIS	SAQ

#### **Biomedical Ethics & Professionalism**

Topic	At the End of The Session, Student Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
	At the end of the session students should be able to;	GQ.		
	Appreciate the value of oath and pledge taken by medical	C2		CAO
Pakistan Medical	student at the time of graduation from medical school		LGIS	SAQ
& Dental Council	• Appraise the importance of principles to be followed by the		LGIS	MCQ VIVA
Code of Ethics	medical and dental practitioners to fulfil the social contract	C2		VIVA
	with the society in order to win the trust of the public in the			
	profession			
	<ul> <li>Cognizant with disciplinary proceedings in case of</li> </ul>	C1		
	violation of rules laid down by regulatory body			

#### **Behavioral Sciences**

Topic	At The End of Lecture Students Should Be Able	Learning	Teaching	Assessment
	To	Domain	Strategy	Tool
	To be able to define eating disorders	C1		
Eating	To be able to describe the types of eating	C2	LGIS	MCQs
Disorders	disorders	C2		
	To make differential diagnosis	C2		
	To be able to manage such conditions			

### **Family Medicine**

Topic	Learning Objectives At the end of the lecture the student should be able to	_	Teaching Strategy	Assessmen t Tool
Approach to a	Discuss what is abdominal pain		LGIS-1	MCQs
Patient with	Discuss its causes	C2		
abdominal pain	Disscus diagnosis & principle of management			

#### **Radiology & Artificial Intelligence**

Topic	At the end of lecture student should be able to	Learning Domain	Teaching Strategy	Assessment Tools
X-ray abdomen	<ul> <li>Identify normal and abnormal radiographs of abdomen (AP view)</li> </ul>	C1		
	• Identify filling defects (Barium meal and Barium enema)		LGIS	MCQs
	• Recognize the correct and incorrect positioning of feeding tubes	C1		
CT Scan MRI abdomen	Identify normal and abnormal CT Scan MRI abdomen	C1	LGIS	MCQs
	Discuss co-relation with Artificial Intelligence	C2		

### **Integrated Undergraduate Research Curriculum (IUGRC)**

Topic	At the End of The Session, Student Should Be	Teaching Strategy	Assessment Tool
Lecture 1: Introduction to Descriptive Statistics	Able To  At the end of the session students should be able to;  • Define & enlist uses of statistical knowledge in research & healthcare profession.  • Differentiate descriptive statistics form inferential statistics  • Appreciate value of information &	LGIS	SAQ MCQ VIVA
Lecture 2: Classification of different types of Data	Classification of  • Enlist data types with examples from		SAQ MCQ VIVA

	<ul> <li>Classify types of data with examples (qualitative &amp; quantitative)</li> <li>Exercise on the identification of different types of data</li> </ul>		
Lecture 3: Scales of Data Measurement	<ul> <li>Enlist types of data measurement scales</li> <li>Elaboration of different types of data measurement scales with example</li> <li>Enlist different method of data presentation (tables, graphs, diagrams, pie chart, Bar graph, histogram. line diagram scatter diagram, statistical maps, pictogram and ogive curve) according to type of data.</li> </ul>	LGIS	SAQ MCQ VIVA
Lecture 4: Measure of central	Explain concept of Measures of central tendency with illustrations form medical background	LGIS	SAQ MCQ VIVA
tendency	<ul> <li>Calculate and interpret the different measures of central tendency</li> </ul>		
Lecture 5: Measures of Dispersion	<ul> <li>Explain concept of Measures of dispersion with illustrations form medical background</li> <li>Calculate and interpret the different measures of dispersion</li> </ul>	LGIS	SAQ MCQ VIVA
Lecture 6: Practice Session	Compute and Interpret results of different measures of dispersion form a given data file	LGIS	SAQ MCQ VIVA

### Enterpreneurship

Topics	Brief Note	Learning Outcomes
Ideate Initial Idea	How it would create value	Understand the concept of ideation in the entrepreneurial context.  Learn techniques for generating creative and innovative business ideas.  Develop skills to evaluate and refine initial ideas for feasibility and viability.

### **Digital Literacy Module**

Topic	Learning Objectives	Teaching	Assessment
	At the end of the lecture the student should be able to		Tool
RMU Goes digital	<ul> <li>Introduction to LMS, CMS and MS Teams.</li> <li>Inrtorduction to RMU website</li> <li>How to use HEC digital library</li> <li>How to use up to date website</li> </ul>	LGIS	MCQs

### **List of Foundation Module Spiral Courses Lectures**

Sr. #	Date/Day	Week	Time	Department	Topic of Lectures	Teacher's Name & Contact #
1.	01-03-2024	1st Week	10:00am-	Quran Translation	Imaniat I (Even)	Mufti Naeem Sherazi 03005580299
	Friday		11:00am		Ibadat I (Odd)	Dr Fahd 03005156800
2.	02-03-2024	1st Week	9:20am –	Behavioral Sciences	Eating Disorders	Dr. Sadia Yasir (Even)
	Saturday		10:10am			Dr. Zona Tahir (Odd)
3.			11:20am-		Pakistan Medical & dental council	Dr. Sidra Hamid 0331-5025147
	04-03-2024	2 <sup>nd</sup> Week	12:10pm	Bioethics & Research	Code of Ethics (even)	
	Monday				Introduction to Descriptive	Dr. Rizwana Shahid 0320-5511684
					Statistics (Odd)	
4.	08-03-2024	2 <sup>nd</sup> Week	10:00am-	Quran Translation-II	Ibadat-II (Even)	Dr Fahd 03005156800
	Friday		11:00am		Imaniyat -II (Odd)	Mufti Naeem Sherazi 03005580299
5.	08-03-2024	2 <sup>nd</sup> Week	11:00am	Quran Translation-II	Ibadat-II (Even)	Mufti Naeem Sherazi 03005580299
	Friday		12:00pm		Imaniyat -II (Odd)	Dr Fahd 03005156800
6.	09-03-2024	2 <sup>nd</sup> Week	9:20am –	Radiology &	Medical Imaging of abdomen-I	Dr. Quratul Ain (Even)
	Saturday		10:10am	Artificial Intelligence		Dr. Aneeqa Saleem (Odd)
7.	12-03-2024	3 <sup>rd</sup> Week	11:10am-	Research -I &	Introduction to descriptive	Dr. Rizwana Shahid 0320-5511684
	Tuesday		11:50am	Bioethics	statistics (Even)	
					Pakistan Medical & dental council	Dr. Sidra Hamid
					Code of Ethics (Odd)	
8.	13-03-2024	3 <sup>rd</sup> Week	09:20am-	Research-II LGIS	Classification of different types of	Dr. Rizwana Shahid 0320-5511684
	Wednesday		10:10am		data	Dr.
9.	14-03-2024	3 <sup>rd</sup> Week	11:10am-	Family Medicine	Common Abdominal diseases	Dr. Sadia
	Thursday		11:50am			Dr. Ishtiaq
	15-03-2024	3 <sup>rd</sup> Week	10:00am	Quran Translation-III	Ibadaat-3	Dr Fahd 03005156800 (Even)
10.	Friday		11:00am		Imaniat-3	Mufti Naeem Sherazi 03005580299
						(Odd)
	15-03-2024	3 <sup>rd</sup> Week	11:00am	Quran Translation-III	Imaniat-3	Mufti Naeem Sherazi 03005580299
11.	Friday		12:00pm			(Even)
					Ibadaat-3	Dr Fahd 03005156800 (Odd)
	16-03-2024	3 <sup>rd</sup> Week	11:10am-	Pak Studies/Islamiyat	Tehreek-E-Pakistan Islaahi	Qari Aman Ullah 03467598528
12.	Saturday		11:50am		Tehreekain	
					Akhirat-I	Mufti Naeem Sherazi 03005580299
13.	19-03-2024	4 <sup>th</sup> Week	10:30am-	Research-III	Scales of Data Measurement	Dr. Rizwana Shahid 0320-5511684
15.	Tuesday		11:10am			Dr. Afifa kalsoom 0333-5506597

						Dr. Ishtiaq
1.4	21-03-2024	4 <sup>th</sup> Week	11:10am-	Research-IV	Research IV: Measures of central	Dr. Rizwana Shahid 0320-5511684
14.	Thursday		12:00pm		Tendency	Dr. Afifa kalsoom 0333-5506597
	22-03-2024	4 <sup>th</sup> Week	08:00am-	Pak	Toheed	Mufti Naeem Sherazi 03005580299
15.	Friday		09:00am	Studies/Islamiyat-I	Qayam e Pakistan, Aghraaz o Maqasid	Qari Aman Ullah 03467598528
	22-03-2024	4 <sup>th</sup> Week	09:00am-	Pak	Qayam e Pakistan, Aghraaz o	Qari Aman Ullah 03467598528
16.	Friday		10:00am	Studies/Islamiyat-I	Maqasid	
					Toheed	Mufti Naeem Sherazi 03005580299
	22-03-2024	4 <sup>th</sup> Week	10:00am-	Entrepreneurship	Ideate Initial Idea	Dr. Asif Maqsood & Dr. Sidra
17.	Friday		11:00am			Hamid
	23-03-2024	4 <sup>th</sup> Week	11:50am –	Pak Studies/Islamiyat	Tehreek-e-Aligarh, Sir Syed	Qari Aman Ullah (Even)
18.	Saturday		01:00pm		Ahmad Khan	
					Akhirat -II	Mufti Naeem Sherazi (Odd)
19.	27-03-2024	5 <sup>th</sup> Week	10:30am-	Research-V	Compute and Interpret measures of	Dr. Rizwana Shahid 0320-5511684
17.	Wednesday		11:10am		central tendency	Dr. Afifa kalsoom 0333-5506597
20.	28-03-2024	5 <sup>th</sup> Week	10:30am-	Research-VI	Measures of dispersion/Secondary	Dr. Rizwana Shahid 0320-5511684
۷٠.	Thursday		11:10am		Data Analysis	Dr. Afifa kalsoom 0333-5506597
	29-03-2024	5 <sup>th</sup> Week	11:10am-	Radiology &	Medical Imaging of abdomen-II	Dr. Sana Yaqoob (Even) \
21.	Friday		11:50am	Artificial Intelligence		0342-2064666
						Dr. Saba Bint e Kashmir (Odd)

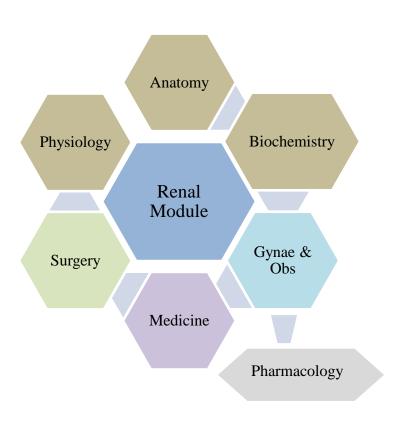


# Rawalpindi Medical University Department of Medical Education (DME)

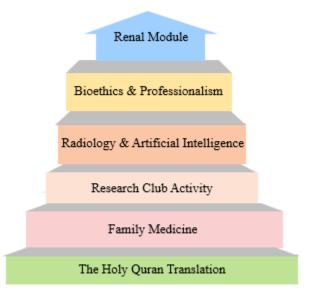
# **Renal Module**



#### **Integration of Disciplines in Renal Module**



#### **Spiral / General Education Cluster Courses**



## **Discipline Wise Details Of Modular Content**

Block	Module	Embryology	Histology	Gross Anatomy
	• Anatomy	<ul><li>Embryology</li><li>Kidney</li><li>Ureter</li><li>Urinary Bladder</li><li>Urethra</li></ul>	<ul><li>Histology</li><li>Kidney</li><li>Ureter</li><li>Urinary Bladder</li></ul>	Posterior Abdominal Wall & Organs of Urinary System
	Biochemistry	<ul> <li>Amino Acid Pool Protein</li> <li>Urea Cycle &amp; Disorder</li> <li>Amino Acid Metabolism</li> <li>Ammonia Toxicity</li> <li>Acid Base in Balance</li> <li>Serum Electrolyte</li> </ul>	Turn Over Nitrogen Balance	e & transport of Amino Acid,
I	• Physiology	<ul> <li>Body Fluid Compartment</li> <li>Physiology of Renal System</li> <li>Regulation of GFR &amp; RI</li> <li>Tubular Reabsorbtion &amp; Micturition Reflex &amp; Ab</li> <li>Acid base balance</li> </ul>	3F Scretion	ECF NICF
-	• The Hely Owner	• Imaniat 3	Spiral Courses	
	• The Holy Quran Translation	<ul><li>Imamat 3</li><li>Ibadat 3</li><li>Imaniat 4</li><li>Ibadat 4</li></ul>		
	<ul> <li>Bioethics &amp; Professionalism</li> </ul>	Ethical principles		
	Radiology & Artificial Intelligence	<ul><li>Prenatal ultrasonography</li><li>Contrast Nephropathy</li></ul>	7	
	Research Club Activity	<ul><li> Questionnaire Developm</li><li> Session on data analysis</li><li> Manuscript writing (Practical Processing Proce</li></ul>		
	<ul> <li>Family Medicine</li> </ul>	Renal Failure		

	Vertical Integration			
Clinically content relevan	t to Renal module			
• Acute renal failure (Med	dicine)			
• Potassium imbalance and	its management (Medicine)			
• CRF & Rehabilitation of	• CRF & Rehabilitation of patient with CRF(Medicine)			
• Hydronephrosis / Pyoneph	nrosis (Surgery)			
• Investigations of urinary t	ract (Surgery)			
• Renal calculi (Surgery)				
<ul> <li>Common renal problems in</li> </ul>	in pregnancy (lower and upper urinary tract infections, hydronephrosis, stress incontinence) (Obstetrics & Gynecology)			
• Introduction to diuretics (	Pharmacology)			
	Entrepreneurship			
• Ideate Initial Idea				
	Early Clinical Exposure (ECE)			
<ul> <li>Clinical Rotations</li> </ul>	Cases of Renal failure			
	• Dialysis			
	Renal Transplant			
	Ultrasound of Kidney			
	Plain X-Ray			
	KUB Nephrotic Syndrome			
	Clinical Themes			
<ul> <li>Acute Renal Failure</li> </ul>				
Renal Calculi				

#### **Renal Module Team**

Module Name : Renal Module
Duration of module : 05 Weeks

Lectures

14. Focal Person Family Medicine

Coordinator:Dr. Sheena TariqCo-coordinator:Dr. Uzma KiyaniReviewed by:Module Committee

Dr. Sadia Khan

	Module Committe	ee		Modu	le Task Force Team	
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Sheena Tariq (Senior Demonstrator of Physiology)	
2.	Director DME	Prof. Dr. Ifra Saeed	2.	DME Focal Person	Dr. Farzana Fatima	
3.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	3.	Co-coordinator	Dr. Ali Raza (Senior Demonstrator of Anatomy)	
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Rahat Afzal (Senior Demonstrator of Biochemistry)	
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Uzma Kiyani (Senior Demonstrator of Physiology)	
6.	Focal Person Anatomy Second Year MBBS	Dr. Maria Tasleem				
7.	Focal Person Physiology	Dr. Sidra Hamid	DME Implementation Team			
			1.	Director DME	Prof. Dr. Ifra Saeed	
8.	Focal Person Biochemistry	Dr. Aneela Jamil	2.	Assistant Director DME	Dr Farzana Fatima	
9.	Focal Person Pharmacology	Dr. Zunera Hakim	3.		Prof. Dr. Ifra Saeed	
				Year MBBS & Director DME	Dr. Farzana Fatima	
10.	Focal Person Pathology	Dr. Asiya Niazi	4.	Editor	Muhammad Arslan Aslam	
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir				
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom				
13.	Focal Person Quran Translation	Dr. Uzma Zafar				

#### Module II - Renal Module

**Rationale:** The urinary system is an important system of the body, and it is also concerned with homeostasis, and it is essential for survival of individuals. Kidney is the principal organ in the urinary system. It is an essential viscous concerned with maintenance of homeostasis. It performs its function through formation of urine in which hazardous waste products of metabolism, drugs, toxins and excess amounts of water and electrolytes are excreted. Kidneys also help in controlling body fluid volume, arterial blood pressure and acid base balance. Where as prostate gland is also is included in this module as it is concerned with production of semen.

#### **Module Outcomes**

By the end of the module, students will be able to:

#### Knowledge

- This module is expected to build students basic knowledge about normal structure, organization, functions and development of urinary system.
  - o Family Medicine
  - **Biomedical Ethics**
  - Artificial Intelligence
  - Research

#### **Skills**

- Demonstrate effective skill for performing and interpreting various laboratory tests like urine routine examination.
- Demostrate awareness of ethical, legal and social implication of issues related to bioethics.

#### **Attitude**

• Demonstrate a **professional attitude**, **team building spirit and good communication** specially in small group discussions.

This module will run in 5 weeks duration. Instructional strategies are given in the timetable and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

#### **Learning Objectives, Teaching Strategies & Assessments (Core Subjects)**

#### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self-Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



## **Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)**

#### **Anatomy Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End of The Lecture the Student Should Be Able To	Domain	Strategy	Tool
	Embryology			
	• Enumerate the derivatives of intermediate mesoderm, urogenital and gonadal ridges.	C1		
	Describe the stages of development of human kidneys	C2		
	Describe the molecular regulation of kidney development.	C2		
	Correlate positional changes of the kidney with its blood supply	C1		SAQ
Development of Kidney & ureter	<ul> <li>Describe different stages of development of ureter from ureteric bud and metanephrogenicblastema.</li> </ul>	C1	LGIS	MCQ VIVA
	Understand the bio-physiological aspects of kidney & ureter development	C2		
	Enumerate Congenital anomalies of kidney and ureter.	C3		
	Correlate the clinical conditions (polycystic kidney, horseshoe shaped kidney)	C3		
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Describe the development of urinary bladder	C2		
	Understand the bio-physiological aspects of bladder development	C2		
Development of	Discuss the parts of urethra in males and females	C2		
urinary bladder &	Describe development of male urethra	C2		G 4 O
urethra	Describe development of female urethra	C2	I CIC	SAQ
	Discuss the anomalies related to urethra & bladder development	C3	LGIS	MCQ VIVA
	Correlate the clinical conditions	C3		VIVA
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
		C3		

	Apply strategic use of AI in health care	C3		
	Read relevant research article			
	Histology			
	• Discuss the structural components of the nephron.	C2		
	<ul> <li>Discuss the histology of filtration barrier.</li> </ul>	C2		
Histology of kidney I	Understand the bio-physiological aspects of filtration	C2		
	• Distinguish the key microscopic components of the renal cortex and medulla.	C2 C2		
	• Differentiate the histological appearance of proximal tubule, loop of Henley, distal convulated tubule and collecting duct.		I CIG	SAQ
(Cortex & Medulla)	Correlate the clinical conditions		LGIS	MCQ VIVA
	Understand the preventive and curative health care measures			VIVA
	Practice the principles of Bioethics			
	Apply strategic use of AI in health care	C3		
	Read relevant research article	_		
	Enumerate the component cells of the juxta glomerular apparatus.	C1		
	Discuss the component cells of the juxtaglomerular apparatus	C2		i
Histology of kidney II	<ul> <li>Discuss the effect of diabetes &amp; hypertension on glomerular filtration rate</li> </ul>	C2		
(Collecting System)	<ul> <li>Understand the effect of hypertension on renin angiotensin release</li> </ul>	C3		0.40
	Correlate the clinical conditions		LGIS	SAQ MCQ
	Understand the preventive and curative health care measures			VIVA
	Practice the principles of Bioethics	C3		, , , , ,
	Apply strategic use of AI in health care			
	Read relevant research article			
	Describe histological characteristics of urinary bladder.	C2		
	Explain the concept of umbrella cells and Uroplakins.	C2		0.4.0
Histology of	Explain the concept of internalization	C2		SAQ MCQ
Urinary bladder	Understand the bio-physiological effects of urinary epithelium	C2	LGIS	MCQ VIVA
	Compare the histological changes of empty and full bladder.	C2		AIAU
	Correlate the clinical conditions			
	Understand the preventive and curative health care measures			
	Practice the principles of Bioethics			

	Apply strategic use of AI in health care     Read relevant research article	C3		
Histology of ureter & urethra	<ul> <li>Describe the microscopic structure of ureter</li> <li>Discuss the histological features of urethra</li> <li>Distinguish the transition in epithelium in different types of urethra</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply strategic use of AI in health care</li> <li>Read relevant research article</li> </ul>	C2 C2 C2 C2	LGIS	SAQ MCQ VIVA

## **Physiology Large Group Interactive Session (LGIS)**

Topic	Learning Objectives At The End Of Lecture Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
	Fluid Intake/Output balance	C1	or access	2 0 0 2 0
Body fluid	<ul> <li>Body fluid compartments</li> </ul>	C2		SAQ
compartments, Volume	<ul> <li>Constituents of ECF &amp; ICF</li> </ul>	C2	LGIS	MCQ
& osmolarity of ECF & ICF.	<ul> <li>Concept of Osmolarity, Osmolality, Osmosis and Osmotic pressure</li> </ul>	C1		VIVA
	Functions of kidney.	C2		
Physiology of Renal	<ul> <li>Physiologic Anatomy of Kidney</li> </ul>	C2		SAQ
system,Glomerular	<ul> <li>Concept of Glomerular Filtration</li> </ul>	C2	LGIS	MCQ
filtration rate	<ul> <li>Introduction to Glomerular filtration rate.</li> </ul>	C1	SGD	VIVA
		C1		
	Volume and osmolarity in abnormalstates	C1		
	<ul> <li>Abnormalities of fluid volume &amp; Regulation</li> </ul>	C1	LGIS	SAQ
	<ul> <li>Hyponatremia and Hypernatremia</li> </ul>	C2	SGD	MCQ

Abnormalities of fluid volume & regulation, Edema	<ul><li>Edema and its Mechanism.</li><li>Fluid in potential spaces of the body</li></ul>	C1 C2		VIVA
A. Regulation of GFR & RBF-I (Determinants of GFR & RBF) Regulation of GFR & RBF-II,Physiological control of GFR and	<ul> <li>Glomerular filtration rate &amp; Renal Blood flow</li> <li>Determinants of GFR</li> </ul>	C1 C1 C2	LGIS SGD	SAQ MCQ VIVA
RBF, Auto regulation of GFR and RBF/Macula densa feedback mechanism	<ul> <li>Determinants of RBF</li> <li>Physiological control of GFR and RBF.</li> <li>Auto regulation of GFR and RBF.</li> <li>Tubulo-glomerular Feedback Mechanism</li> <li>Macula-densa Feedback Mechanism</li> </ul>	C1 C1 C2 C1 C2 C3	LGIS SGD	SAQ MCQ VIVA
Tubular reabsorption & secretion along various parts of nephrons	<ul> <li>Tubular reabsorption &amp; secretion in</li> <li>Proximal tubule</li> <li>Loop of Henle</li> <li>Distal tubule &amp; collecting tubule.</li> <li>Active and passive transport mechanisms</li> </ul>	C1 C2 C1 C1 C2	LGIS Group presentations	SAQ MCQ VIVA
Regulation of tubular reabsorption	<ul> <li>Concept of Glomerulo tubular Balance</li> <li>Peritubular capillary and Renal interstitial fluid Physical forces.</li> <li>Mechanism of Pressure natriuresis and Pressure diuresis</li> </ul>	C1 C2	LGIS SGD Group presentations	SAQ MCQ VIVA
A. Clearance methods to quantify kidney function Micturition reflex & Abnormalities of micturition	<ul> <li>Clearance Methods (Inulin clearance, Creatinine clearance, Para ammino hipuric acid clearance)</li> <li>Filtration Fraction</li> <li>Anatomy of bladder</li> <li>Micturition and urine formation.</li> <li>Control of Micturition and Micturition Reflex</li> <li>Abnormalities of Micturition Reflex</li> </ul>	C1 C1 C1 C1 C1 C2	LGIS SGD	SAQ MCQ VIVA

## **Biochemistry Large Group Interactive Session (LGIS)**

Topic	<b>Learning Objectives</b>	Learning	Teaching	Assessment
	At The End Of Lecture Students Should Be Able To	Domain	Strategy	Tool
	Understand protein turn-over, amino acid pool and entry	C2		MCQs,
Introduction to	of amino acid into cell		LGIS	SAQs &
protein metabolism				Viva
	Describe positive and negative nitrogen balance	C2		MCQs,
Nitrogen balance			LGIS	SAQs &
				Viva
	Discuss reactions of amino acids	C2		MCQs,
General reactions of	Interpret the clinical importance of transaminases	C3	LGIS	SAQs &
amino acids				Viva
	Explain sources of NH <sub>3</sub> formation and its transport	C2		
Metabolism of	Discuss causes and effects of Hyperammonemia		LGIS	MCQs,
ammonia	Explain mechanism of ammonia toxicity	C3		SAQs &
				Viva
		C2		
	Describe the location, steps and regulation of Urea cycle	C2		MCQs,
Urea cycle			LGIS	SAQs &
				Viva
	Describe Disorders of the urea cycle	C2		MCQs,
Disorders of urea			LGIS	SAQs &
cycle				Viva
	Explain Glycine metabolism and related disease	C2		MCQs,
Metabolism of			LGIS	SAQs &
glycine				Viva
	Explain Phenyl alanine & tyrosine metabolism	C2		MCQs,
Metabolism of	Discuss related inherited disorders		LGIS	SAQs &
phenyl alanine and		C3		Viva
tyrosine				
	Explain Tryptophan metabolism	C2		MCQs,
Metabolism of	Discuss related inherited disorders	C3	LGIS	SAQs &
Tryptophan				Viva

	Describe metabolism of sulpher containing amino acids	C2		MCQs,
Metabolism of	Discuss related disorders		LGIS	SAQs &
methionine		C3		Viva
Metabolism of	Explain Metabolism of branched chain amino acids	C2		MCQs,
branched chain	Discuss related inherited disorders		LGIS	SAQs &
amino acids		C3		Viva
	Discuss Synthesis of polyamines and their clinical			MCQs,
Metabolism of	significance	C2	LGIS	SAQs &
polyamines				Viva
	Explain causes and compensation of metabolic and	C2		MCQs,
Acid base imbalance	respiratory acid base disorders		LGIS	SAQs &
	Describe anion gap and its significance	C2		Viva
	Interpret different acid base disorders	C3		
	Explain Distribution of water in different compartments of	C2		MCQs,
Water	body		LGIS	SAQs &
	Interpret Dehydration & over hydration	C3		Viva
	Describe Daily requirements, sources and functions of	C2		MCQs,
Electrolytes Sodium	sodium		LGIS	SAQs &
(Na)	Explain causes and effects of hyponatremia &	C3		Viva
	hypernatremia			
	Describe Daily requirements, sources and functions of	C2		
	potassium		LGIS	MCQs,
Potassium	Explain causes and effects of hypokalemia &	C3		SAQs &
	hyperkalemia			Viva
	Describe Daily requirements, sources, functions & their	C2		
Chloride (Cl) &	deficiency and toxic effects on body		LGIS	MCQs,
Bicarbonate (HCO <sub>3)</sub>				SAQs &
				Viva

#### **Anatomy Small Group Discussion (SGDs)**

Topics	Learning Objectives Students Should Be Able To	Learning Domain	Teaching	Assessment Tool
			Strategy	1 001
	Describe thethe fascia of posterior abdominal wall	C2		OGDE
Posterior abdominal wall I (Fascia & Muscles)	Tabulate the muscles of posterior abdominal wall with	C2		OSPE
	reference to, origen, insertion, nerve supply and action,	C2	Skill labs	MCQ
	<ul> <li>Describe the relations of Psoas major muscle.</li> </ul>	C2 C3	Skill labs	SAQ VIVA
	• Correlate the clinical conditions (Psoas Abscess)	C3		VIVA
	• Understand the preventive and curative health care measures	C3		
	<ul> <li>Map Root of mesentery on SP/Model</li> </ul>	C3		
	<ul> <li>Practice the principles of Bioethics</li> </ul>	C3		
	<ul> <li>Apply Strategic use of AI in health care</li> </ul>	C3		
	Read relevant research articles			
	<ul> <li>Trace the nerves present on posterior abdominal wall</li> </ul>	C2		
	<ul> <li>Discuss the formation of nerves</li> </ul>	C2		0.000
Posterior	<ul> <li>Discuss the formation of lumbosacral plexus</li> </ul>	C2	01 11 1 1	OSPE
abdominal wall II	<ul> <li>Correlate the clinical conditions (Lumbar symphathectomy)</li> </ul>	C2	Skill lab	MCQ
(Nerves)	<ul> <li>Understand the preventive and curative health care measures</li> </ul>	C3		SAQ
	•	C3 C3		VIVA
	<ul> <li>Practice the principles of Bioethics</li> </ul>	C3		
	<ul> <li>Apply Strategic use of AI in health care</li> </ul>	C3		
	<ul> <li>Read relevant research articles</li> </ul>	C3		
	Enlist branches of Abdominal Aorta.	C1		
	<ul> <li>Describe the tributaries of inferior vena cava.</li> </ul>	C2		
	<ul> <li>Describe the tributaires of inferior veha cava.</li> <li>Describe lymph nodes of posterior abdominal wall with</li> </ul>	C2		OSPE
Posterior	emphasis on lumbar and intestinal trunk.		Skill lab	MCQ
abdominal wall III	<ul> <li>Differentiate between typical and atypical lumbar vertebrae.</li> </ul>	C2		SAQ
(vessels)	<ul> <li>Identify different parts of lumbar vertebrae.</li> </ul>	C2		VIVA
& Lumbar Vertebrae	<ul> <li>Discuss the attachments of lumbar vertebrae.</li> </ul>	C2		
	<ul> <li>Correlate the clinical conditions (abdominal aortic aneurysm)</li> </ul>	C3		
		C3		
	Understand the preventive and curative health care measures	C3		

	<ul> <li>Map Abdominal aorta, Inferior Vena cava &amp; Portal vein on simulated patient (SP)/Model</li> <li>Practice the principles of Bioethics</li> <li>Apply Strategic use of AI in health care</li> <li>Read relevant research articles</li> </ul>	P C3 C3 C3 C3		
Kidney	<ul> <li>Discuss the site and extent of kidneys</li> <li>Differentiate right from left kidney</li> <li>Understand the bio-physiological aspects of kidney</li> <li>Discuss the renal capsule and its role in support of kidney.</li> <li>Describe the structure of cortex and medulla</li> <li>Describe peritoneal relationship of both kidneys.</li> <li>Describe visceral relationship of both kidneys</li> <li>Explain blood supply of both kidneys with emphasis on renal artery.</li> <li>Discuss the venous drainage of both kidneys.</li> </ul>	C2 C2 C2 C2 C2 C2 C2 C2 C2 C2 C2	Skill lab	OSPE MCQ SAQ VIVA
	<ul> <li>Correlate the clinical conditions (perinephric abscess, nephroptosis, renal cysts and renal colic)</li> <li>Understand the preventive and curative health care measures</li> <li>Map the kidney on the back (Morrison's Parrallelogram) on SP/Model</li> <li>Practice the principles of Bioethics</li> <li>Apply Strategic use of AI in health care</li> <li>Read relevant research articles</li> </ul>	C3 P C3 C3 C3 C3		
Ureter	<ul> <li>Discuss extent and course of ureter in abdomen and pelvis in males and females</li> <li>Explain peritoneal reflections of ureter in both sexes.</li> <li>Describe relations of ureter.</li> <li>Describe the arterial, venous and lymphatic drainage of ureter.</li> <li>Correlate the clinical conditions (ureteric colic)</li> <li>Understand the preventive and curative health care measures</li> </ul>	C2 C2 C2 C2 C2 C3 C3 C3	Skill lab	OSPE MCQ SAQ VIVA

	Map Ureter from the back on SP/Model	P		
	Practice the principles of Bioethics	C3		
	Apply Strategic use of AI in health care	C3		
	Read relevant research articles	C3		
		C2		
	Describe the location & visceral relations of right and left	C2		
	supra renal glands	C2		OSPE
	Understand the bio-physiological aspects of kidney	C2		MCQ
Supra renal gland	Discuss supra renal cortex and medulla	C2	Skill lab	SAQ
	Discuss vessels and nerves of supra renal gland			VIVA
	Correlate the clinical conditions			
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply Strategic use of AI in health care	C3 C3		
	Read relevant research articles	C3		
	Interpret size and extent of urinary bladder in different ages and	C2		
Urinary bladder	states.		Skill lab	OSPE
-	Discuss the peritoneal and visceral relationships of urinary			MCQ
	bladder(bladder bed)	C2		SAQ
	<ul> <li>Understand the bio-physiological aspects of kidney</li> </ul>	~		VIVA
		C2		
	Discuss the trigone of urinary bladder  The description of the de	C2 C2		
	Elaborate nerve supply of urinary bladder	CZ		
	Correlate the clinical conditions (urinary incontinence,	C3		
	suprapubiccystotomy and atonic bladder)			
	Understand the preventive and curative health care measures	C3		
	Practice the principles of Bioethics	C3		
	Apply Strategic use of AI in health care	C3		
	Read relevant research article	C3		

Urethra	<ul> <li>Describe different parts of male and female urethra.</li> <li>Explain blood supply, innervation and lymphatics of urethra in both sexes</li> <li>Discuss the clinically significant differences between male and female urethra</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply Strategic use of AI in health care</li> <li>Read relevant research articles</li> </ul>	C2 C2 C2 C3 C3 C3 C3 C3	Skill lab	OSPE MCQ SAQ VIVA
Cross Sectional Anatomy	<ul> <li>Identify different structures at different levels of vertebral coloumn;L2,L3,L4,L5</li> <li>Correlate the clinical conditions at the given level</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply Strategic use of AI in health care</li> <li>Read relevant research articles</li> </ul>	C2 C3 C3 C3 C3 C3 C3 C3 C3	Skill lab	OSPE MCQ SAQ VIVA
Radiology	<ul> <li>Identify structures on a normal X-ray abdomen</li> <li>Identify kidney and its associated structures on contrast studies.</li> <li>Appreciate filling defects.</li> <li>Mark anatomical landmarks.</li> <li>Correlate the clinical conditions</li> <li>Understand the preventive and curative health care measures</li> <li>Practice the principles of Bioethics</li> <li>Apply Strategic use of AI in health care</li> <li>Read relevant research articles</li> </ul>	C2 C2 C2 P P C3 C3 C3 C3 C3	Skill lab	OSPE MCQ SAQ VIVA

#### **Physiology Small Group Discussion (SGDs)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	Students Should Be Able To	Domain	Strategy	Tools
	<ul> <li>Explain factors effecting GFR</li> </ul>	C2		MCQ
GFR & RBF	Discuss determinants of RBF	C2	SGD	SEQ
	Explain autoregulatory mechanism of GFR & RBF	C2	]	VIVA
				OSPE
Micturition	<ul> <li>Describe the physiological anatomy &amp; nervous connections</li> </ul>	C1	SGD	MCQ
	of urinarybladder			SEQ
	<ul> <li>Explain Micturition reflex</li> </ul>	C2		VIVA
	<ul> <li>Discuss abnormalities of Micturition</li> </ul>	C2		OSPE
	Define Renal clearance	C1		MCQ
Clearancemethods	<ul> <li>Enumerate &amp; Explain clearance methods to quantify renal</li> </ul>	C1	SGD	SEQ
	functions			VIVA
	Explain filtration fraction	C2		OSPE
	Describe mechanism of action of buffer systems of body fluid	C1		MCQ
Acid basebalance			SGD	SEQ
	<ul> <li>Discuss buffering power of respiratory &amp; renal system</li> </ul>	C2		VIVA
	<ul> <li>Explain the acid base disorders</li> </ul>	C2		OSPE

#### **Biochemistry Small Group Discussion (SGDs)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Tutorial Students Should Be Able To	Domain	Strategy	Tool
Phenylalanine	Explain Metabolim of phenylalanine Metabolism			MCQs,
Metabolism		C2	SGD	SAQs &
				Viva
Metabolism of	Explain metabolism and related disorders of amino		SGD	MCQs,
tryptophan, tyrosine and	acids	C2		SAQs &
branched chain amino				Viva
acids				

	Explain formation, transport and toxicity of ammonia in the		SGD	MCQs,
Hyper Amonia	body	C2		SAQs &
				Viva
	Explain causes and compensation of acid base disorders		SGD	MCQs,
Acid base imbalance		C2		SAQs &
				Viva
	Describe causes and effects of hypo and hyper natremia,		SGD	MCQs,
Sodium & Chloride	hypo and hyper kalemia	C2		SAQs &
Metabolism				Viva

## **Anatomy Self Directed Learning (SDL)**

Topics	Learning Objectives Students Should Be Able To	Learning Resources
Posterior abdominal wall I (Fascia & Muscles)	<ul> <li>Describe the fascia of posterior abdominal wall</li> <li>Tabulate the muscles of posterior abdominal wall with reference to, origen, insertion, nerve supply and action,</li> <li>Describe the relations of Psoas major muscle.</li> <li>Discuss Psoas abscess</li> <li>Read a relevant research article</li> <li>Use digital Library</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8<sup>TH</sup>Edition. (Chapter 5, Page 537- 541).</li> <li>https://www.youtube.com/watch?v=5ZnlcZrC-XY</li> </ul>
Posterior abdominal wall II (Nerves)	<ul> <li>Trace the nerves present on posterior abdominal wall</li> <li>Discuss the formation of nerves</li> <li>Discuss the formation of lumbosacral plexus</li> <li>Discuss clinical significance of Lumbar symphathectomy</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 5, Page 527-532).</li> <li>https://www.youtube.com/watch?v=5ZnlcZrC-XY</li> </ul>
Posterior abdominal wall III (vessels) & Lumbar Vertebrae	<ul> <li>Enlist branches of Abdominal Aorta.</li> <li>Describe the tributaries of inferior vena cava.</li> <li>Describe lymph nodes of posterior abdominal wall with emphasis on lumbar and intestinal trunk.</li> <li>Differentiate between typical and atypical lumbar vertebrae.</li> <li>Identify different parts of lumbar vertebrae.</li> <li>Discuss the attachments of lumbar vertebrae.</li> <li>Discuss abdominal aortic aneurysm</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 5, Page 541-544, 544-547).</li> <li>https://www.youtube.com/watch?v=pSDYIPzNg4s</li> </ul>
Kidney	<ul> <li>Discuss the site and extent of kidneys</li> <li>Differentiate right from left kidney</li> <li>Understand the bio-physiological aspects of kidney</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 5, Page 515-517,523-524).</li> <li><a href="https://www.youtube.com/watch?v=ZVIVquVYGDo">https://www.youtube.com/watch?v=ZVIVquVYGDo</a></li> </ul>

	<ul> <li>Discuss the renal capsule and its role in support of kidney.</li> <li>Describe the structure of cortex and medulla</li> <li>Describe peritoneal relationship of both kidneys.</li> <li>Describe visceral relationship of both kidneys</li> <li>Explain blood supply of both kidneys with emphasis on renal artery.</li> <li>Discuss the venous drainage of both kidneys.</li> <li>Discuss related clinicals; perinephric abscess, nephroptosis, renal cysts and renal colic</li> </ul>	
Ureter	<ul> <li>Discuss extent and course of ureter in abdomen and pelvis in males and females</li> <li>Explain peritoneal reflections of ureter in both sexes.</li> <li>Describe relations of ureter.</li> <li>Describe the arterial, venous and lymphatic drainage of ureter.</li> <li>Discuss the related clinicals; ureteric colic</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 5, Page 517-518,525).</li> <li>https://www.youtube.com/watch?v=1P0utMb5nkg</li> </ul>
Supra renal gland	<ul> <li>Describe the location &amp; visceral relations of right and left supra renal glands</li> <li>Understand the bio-physiological aspects of kidney</li> <li>Discuss supra renal cortex and medulla</li> <li>Discuss vessels and nerves of supra renal gland</li> <li>Discuss the related clinicals</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 5, Page 519-523).</li> <li>https://www.youtube.com/watch?v=iE8nCvLaGM4</li> </ul>
Urinary bladder	<ul> <li>Interpret size and extent of urinary bladder in different ages and states.</li> <li>Discuss the peritoneal and visceral relationships of urinary bladder(bladder bed)</li> <li>Understand the bio-physiological aspects of kidney</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 6, Page 591-595).</li> <li><a href="https://www.youtube.com/watch?v=tGouMldaQgU">https://www.youtube.com/watch?v=tGouMldaQgU</a></li> </ul>

	Discuss the trigone of urinary bladder	
	<ul> <li>Elaborate nerve supply of urinary bladder</li> </ul>	
	<ul> <li>Discuss the related clinicals; urinary incontinence, suprapubiccystotomy and atonic bladder</li> </ul>	
	<ul> <li>Describe different parts of male and female urethra.</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.8TH Edition. (Chapter 6, Page 595).</li> </ul>
Urethra	<ul> <li>Explain blood supply, innervation and lymphatics of urethra in both sexes</li> </ul>	* https://www.youtube.com/watch?v=EQUdo392wg0
	<ul> <li>Discuss the clinically significant differences</li> </ul>	
	between male and female urethra	
	Read a relevant research article	

## **Physiology Self Directed Learning (SDL)**

Topics Of SDL	Learning Objective	References
	Fluid Intake/Output balance	❖ Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition. Regulation of
	Body fluid compartments	ECF composition and volume Section 07 (Chapter 38, Page 695)
Body fluid compartments,	<ul> <li>Constituents of ECF &amp; ICF</li> </ul>	❖ Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition.Renal Physiology (Chapter 06.
Volume & osmolarity of	<ul> <li>Concept of Osmolarity,</li> </ul>	Page 245)
ECF &ICF.	Osmolality,Osmosis and	❖ Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition.
	Osmotic pressure	Section 04. Physiology of Body Fluids. (Chapter 26, Page 449-459)
		❖ Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. The
		Body Fluids And Kidneys. Section 05. (Chapter 25, Page 305-313)
	• Functions of kidney.	• Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition. Renal Physiology
	Physiologic Anatomy of Kidney	(Chapter 37, Page 671)
Physiology of Renal	Concept of Glomerular Filtration	• Human Physiology by Dee Unglaub Silver thorn. 8 <sup>TH</sup> Edition. The Kidneys
system, Glomerular	Introduction to Glomerular filtration	(Chapter 19 Page 624-636)
filtration rate	rate.	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition.</li> </ul>
		Section 04. Physiology of Body Fluids. (Chapter 27, Page 460-469)
		❖ Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. The Body
		Fluids And Kidneys.
		Section 05. (Chapter 26, Page 321-324) (Chapter 27, Page 331-332)

Abnormalities of fluid volume & regulation, Edema	<ul> <li>Volume and osmolarity in abnormal states</li> <li>Abnormalities of fluid volume &amp; Regulation</li> <li>Hyponatremia and Hypernatremia</li> <li>Edema and its Mechanism.</li> <li>Fluid in potential spaces of the body</li> </ul>	<ul> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Renal Physiology (Chapter 06. Page 251)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. The Kidneys (Chapter 20 Page 672-677)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 04. Regulation of Volume and Osmolality of the Body Fluids. (Chapter 32, Page 530)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. The Body Fluids And Kidneys.Section 05. (Chapter 25, Page 314-320)</li> </ul>
B. Regulation of GFR & RBF-I(Determinants of GFR & RBF) C. Regulation of GFR & RBF-II, Physiological control of GFR and	<ul> <li>Glomerular filtration rate &amp; Renal Blood flow</li> <li>Determinants of GFR</li> </ul>	<ul> <li>A.</li> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Regulation of ECF composition andvolume, Section 07 (Chapter 37, Page 674)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Renal Physiology (Chapter 06. Page 257,261)</li> </ul>
RBF, Auto regulation of GFR and RBF/Macula densa feedback mechanism	<ul> <li>Determinants of RBF</li> <li>Physiological control of GFR and RBF.</li> <li>Auto regulation of GFR and RBF.</li> <li>Tubulo-glomerular Feedback Mechanism</li> <li>Macula-densa Feedback Mechanism</li> </ul>	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.         Section 04. Physiology of Body Fluids. (Chapter 28,Page 473)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. The         Body Fluids And Kidneys. Section 05. (Chapter 27, Page         331,333,337)</li> <li>B.</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. The         Body Fluids And Kidneys. Section 05. (Chapter 27, Page 337,342)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition.         Section 04. Filtration and Blood Flow. (Chapter 28,Page 476,483)</li> </ul>
Tubular reabsorption & secretion along various parts of nephrons	<ul> <li>Tubular reabsorption &amp; secretion in</li> <li>Proximal tubule</li> <li>Loop of Henle</li> <li>Distal tubule &amp; collecting tubule.</li> <li>Active and passive transport mechanisms</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Regulation of ECF composition and volume Section 07 (Chapter 37, Page 679)</li> <li>Physiology by Linda S. Costanzo 6th Edition. Renal Physiology (Chapter 06. Page 267)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. The Kidneys (Chapter 19 Page 636,643)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. Section 04. Physiology of Body Fluids. (Chapter 29,Page 487-497). (Chapter 30,Page 498). (Chapter 31,Page 508)</li> <li>❖ Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. The</li> </ul>

		Body Fluids And Kidneys. Section 05. (Chapter 28, Page 343,355)
Regulation of tubular reabsorption	<ul> <li>Concept of Glomerulo tubular Balance</li> <li>Peritubular capillary and Renal interstitial fluid Physical forces.</li> <li>Mechanism of Pressure natriuresis and Pressure diuresis</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Regulation of ECF composition and volume Section 07 (Chapter 39, Page 709)</li> <li>Physiology by Linda S. Costanzo 6th Edition. Renal Physiology (Chapter 06. Page 276,298)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. The Body Fluids And Kidneys. Section 05. (Chapter 28, Page 355-360)</li> </ul>
B. Clearance methods to quantify kidney function C. Micturition reflex & Abnormalities of micturition	<ul> <li>Clearance Methods (Inulin clearance,</li> <li>Creatinine clearance, Para ammino hipuric acid clearance)</li> <li>Filtration Fraction</li> <li>Anatomy of bladder</li> <li>Micturition and urine formation.</li> <li>Control of Micturition and Micturition Reflex</li> <li>Abnormalities of Micturition Reflex</li> </ul>	<ul> <li>A.</li> <li>Physiology by Linda S. Costanzo 6th Edition.Renal Physiology (Chapter 06. Page 255)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. The Kidneys (Chapter 19,Page 643- 647)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. Section 04. (Chapter 27, Page 469,483)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. The Body Fluids And Kidneys. Section 05. (Chapter 28, Page 360-364)</li> <li>B.</li> <li>Ganong's Review of Medical Physiology.25TH Edition. Regulation of ECF composition and volume Section 07 (Chapter 37, Page 691)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. The Kidneys (Chapter 19,Page 648)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. The Body Fluids And Kidneys. Section 05. (Chapter 26, Page 324-328)</li> </ul>

## **Biochemistry Self Directed Learning (SDL)**

Topics Of SDL	Learning Objectives	Learning resources		
Amino Acids Pool, Protein	Understand protein turn-over, amino acid pool and entry	• Lippin cott Biochemistry 8 <sup>th</sup> edition (chapter 19 page -		
Turnover, Nitrogen balance	of amino acid into cell	271)		
& Transport of Amino Acids	<ul> <li>Describe positive and negative nitrogen balance</li> </ul>	• https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3854183/		
	Describe the location, steps and regulation of Urea cycle	• Lippin cott Biochemistry 8 <sup>th</sup> edition (chapter 19 page -		
Urea cycle & its Disorders	<ul> <li>Describe Disorders of the urea cycle</li> </ul>	279)		
		• <a href="https://my.clevelandclinic.org/health/diseases/23470-">https://my.clevelandclinic.org/health/diseases/23470-</a>		

		<u>urea-cycle-disorder</u>
Arginine & Branched Chain	Explain Metabolism of branched chain amino acids	• Harper's illustrated biochemistry 32 <sup>nd</sup> edition (Chapter 40
Amino Acid Metabolism,	Discuss related inherited disorders	page 477)
Ammonia Toxicity		• https://link.springer.com/article/10.1007/BF00998474
	Describe Daily requirements, sources and functions of	Essentials of medical Biochemistry. Mushtaq Ahmad Vol
Sodium & Chloride	sodium	– I 9 <sup>th</sup> edition (Chapter 02 page 46)
Metabolism	Explain causes and effects of hyponatremia &	• https://www.sciencedirect.com/topics/medicine-and-
	hypernatremia	dentistry/sodium-metabolism
	Describe Daily requirements, sources, functions & their	
	deficiency and toxic effects on body	

#### **Histology Practicals Skill Laboratory (SKL)**

Topic	At the End Of Practical Students Should Be	Learning	Teaching	Assessment
	Able To	Domain	Strategy	Tool
	<ul> <li>Identify the histological slide of kidney.</li> </ul>	P		
kidney	• Illustrate the histological structure of Kidney.	C2	Skill Lab	OSPE
-	<ul> <li>Enlist two points of identification.</li> </ul>	C1		
	• Focus the slide	P		
	Identify the histological slide of ureter	P		
Ureter	• Illustrate the histological structure of ureter.	C2	Skill Lab	OSPE
	<ul> <li>Enlist two points of identification.</li> </ul>	C1		
	• Focus the slide	P		
	Identify the histological slide of urinary	P		
Urinary	bladder.	C2	Skill Lab	OSPE
bladder	Illustrate the histological structure of urinary	C1		
	bladder	P		
	<ul> <li>Enlist two points of identification.</li> </ul>			
	<ul> <li>Focus the slide</li> </ul>			

#### **Physiology Practicals Skill Laboratory (SKL)**

Practical	At the End of This Skill Lab, Student	Learning	Teaching	Assessment
	<b>Should Be Able to Illustrate:</b>	Domain	Strategy	Tools
	<ul> <li>Apparatus identification</li> </ul>	C1		
Specific gravity	<ul> <li>Principle</li> </ul>	C1		
of Urine	<ul> <li>Procedure</li> </ul>	P, A	Skill lab	OSPE
	<ul> <li>Precautions</li> </ul>	C1		
	<ul> <li>Use of urinometer</li> </ul>	C1		
	<ul> <li>Recall normal values of specific gravity</li> </ul>	C1		

#### **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Practical Students	Domain	Strategy	Tool
	Should Be Able To			
	Examine urine for its color, odor, pH	P		
Urine analysis I	and specific gravity Perform tests on		Skill Lab	OSPE
	urine to detect its normal			
	constituents			
	Perform tests to detect abnormal	P		
Urine analysis II	constituents of urine (proteins,		Skill Lab	OSPE
	ketone bodies, bile salts)			
Estimation of	Perform estimation of urea	P	Skill Lab	
urea				OSPE
Estimation of	Perform estimation of creatinine	P	Skill Lab	
creatinine				OSPE

#### **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

## **Basic and Clinical Sciences (Vertical Integration)**

#### Case Based Learning (CBL)

Subject	Topic	Learning Objectives	Learning
		At the end of the lecture the student should be able to	Domain
	Renal Failure	Apply basic knowledge of subject to study clinical case.	C3
Anatomy	Ureteric Colic	Apply basic knowledge of subject to study clinical case.	C3
	Acute Glomerulo Nephritis	Apply basic knowledge of subject to study clinical case.	C3
Physiology	Anuria	Apply basic knowledge of subject to study clinical case.	C3
	Metabolic Acidosis	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	Ammonia Toxicity	Apply basic knowledge of subject to study clinical case.	C3

#### **Problem Base Learning (PBL)**

Subject	Topic	Learning Objectives	Learning
		At the end of the lecture the student should be able to	Domain
PBL	Renal Failure	Apply basic knowledge of subject to study clinical case.	C3

## **Large Group Interactive Sessions (LGIS)**

## Surgery

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Investigations of urinary tract	• Understand the diagnostic approach and interpretation of urinary tract investigations including urinalysis, urine culture, ultrasonography, and intravenous urography.	C2		
	• Demonstrate proficiency in recognizing common urinary tract disorders through investigative findings, facilitating accurate diagnosis and management decisions.	C2	LGIS	MCQs
	• Define hydronephrosis and pyonephrosis, including their etiology and pathophysiology.	C2		
Hydronephrosis / Pyonephrosis	• Identify clinical presentations, diagnostic modalities, and management strategies for both conditions, emphasizing the importance of early recognition and intervention to prevent renal damage.	C2	LGIS	MCQs

#### Medicine

Topic	At The End of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Acute renal failure	Understand the etiology, pathophysiology, and clinical manifestations of ARF	C2	LGIS	MCQs
	Recognizing the diagnostic criteria and appropriate investigations for ARF	C2	LGIS	MCQs
CRF &	• Understand the etiology, pathophysiology, clinical manifestations, and management options of CRF.	C2	LGIS	MCQs
Rehabilitation of patient with CRF	• Recognize the importance of rehabilitation strategies such as dietary modifications, medication management, dialysis, and transplantation in improving patient outcomes and quality of life.	C2	LGIS	MCQs

Potassium imbalance	• Understand the physiological role of potassium in the body and recognize the clinical manifestations of hypo- and hyperkalemia.	C2	LGIS	MCQs
and its management	Develop competence in diagnosing and managing potassium imbalances, including appropriate treatment modalities and monitoring strategies.	C2	LGIS	MCQs

#### **Community Medicine**

Topic	At The End Of Lecture Students Should Be Able	Learning	Teaching	Assessment
	To	Domain	Strategy	Tool
Biostatistics-1	Define biostatistics and correlate its importance in	C1		
Basic concepts and	medical research.		LGIS	MCQs
uses (Descriptive).	Understand data and its types	C2		
Data and its types.				
Biostatistics-2	Define biostatistics and correlate its importance in	C1		
Basic concepts and	medical research.		LGIS	MCQs
uses (Descriptive).	Understand data and its types	C2	-	
Data and its types.	Chacistana data and its types			

#### Obstetrics & Gynaecology

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Physiological changes in the renal	• The anatomic and functional changes in the renal system in pregnancy	C2	LGIS	MCQs
system in pregnancy	• The changes in indices of renal function during pregnancy	C2		

## Pharmacology

Topic	At The End Of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
Introduction to	• Understanding the mechanism of action of diuretics in altering renal function to promote urine production.	C2		MCQs
diuretics	• Identifying the major classes of diuretics, their pharmacokinetics, clinical indications, and potential side effects.	C2	LGIS	
	• Exploring the role of diuretics in managing conditions such as hypertension, edema, and congestive heart failure	C2		

#### **List of Renal Module Vertical Courses Lectures**

Sr. #	Date/Day	Week	Department	Time	Topic Of Lectures	Teachers Name & Contact #	
1.	06-05-2024 MONDAY	3 <sup>rd</sup>	Surgery	10:30 am – 11:20 am	Investigations of urinary tract	Dr. Faraz Basharat Dr. Muhammad Amin	
2.	06-05-2024 MONDAY	3 <sup>rd</sup>	Medicine	11:20 am – 12:10 Pm	Acute renal failure	Dr. Saima Meer 0343-5761430 Dr. Mudassir	
3.	07-05-2024 TUESDAY	3 <sup>rd</sup>	Medicine	11:20- 12:10pm	CRF & Rehabilitation of patient with CRF	Dr. Mudassar 0321-6813249 Dr. Saima Meer 0343-5761430	
4.	08-05-2024 WEDNESDAY	3 <sup>rd</sup>	Surgery	10:30 am – 11:20 am	Hydronephrosis / Pyonephrosis	Dr. Muhammad Ali Dr. Ahmed Shahzad	
5.	08-05-2024 WEDNESDAY	3 <sup>rd</sup>	Obstetrics & Gynecology	11:20 am – 12:10 pm	Common renal problems in pregnancy (lower and upper urinary tract	Dr. Humaira Noreen	
					infections, hydronephrosis, stress incontinence)	Dr. Talat Farkhanda	
6.	13-05-2024	4 <sup>th</sup>	Medicine	11:20 am - 12:10 pm	Potassium imbalance and its	Dr. Mudassar 0321-6813249	
	MONDAY				management	Dr. Saima Meer 0343-5761430	
7.	15-05-2024 WEDNESDAY	4 <sup>th</sup>	Pharmacology	11:20 am – 10:10 Am	Introduction to diuretics	Dr. Uzma 0336-5178766 (Even) Dr. Haseeba 0331-4453835 (Odd)	

#### **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

#### **Content**

- Longitudinal Themes
  - o The Holy Quran Translation
  - o Biomedical Ethics & Professionalism
  - o Family Medicine
  - o Artificial Intelligence (AI) and Innovation
  - $\circ \quad Integrated \ Undergraduate \ Research \ Curriculum \ (IUGRC)$
  - o Entrepreneurship
  - o Early Clinical Exposure (ECE)

#### **The Holy Quran Translation Lecture**

Topic	Learning Objectives	Learning	Teaching	Assessmen
	At the end of the lecture the student should be able to	Domain	Strategy	t Tool
Imaniat	<ul> <li>Describe the answers to questions of the Pagans of Arab</li> <li>Describe the purpose of sending the Prophets.</li> </ul>	C2	LGIS	SAQ
Ibadat	<ul> <li>Understand the concept of Hijrah in Holy Quran</li> <li>Disscus the significance of consistency in religion</li> </ul>	C2	LGIS	SAQ

#### Radiology & Artificial Intelligence

Topic	At The End of Lecture Students Should Be Able To	Learning	<b>Teaching</b>	Assessment
		Domain	Strategy	Tool
Prenatal	• Interpret normal ultrasonography of renal system	C2		
Ultrasonography	• Discuss features of different congenital abnormalities of renal	C2	LGIS	MCQs
	system			
Contrast	• Understand the diverse manifestations of nephropathy, including	C2	LGIS	MCQs
Nephropathy	diabetic nephropathy and IgA nephropathy			

#### **Biomedical Ethics and Professionalism**

Topic	At the end of the lecture the student should be able to	Learning	Teaching	Assessment
		Domain	Strategy	Tool
Islam & Teachings of Bioethics	Conceptualize the Islamic teachings of medical ethics.			
	Outline the main points in oath of Muslim doctor.			
	• Correlate the 4 principles of medical ethics with principles of Islamic medical ethics			
Ethics of social media & advertising  Ethical principles	• Delineate the principles of ethics involved in social media & advertising including.			
	Publishing or broadcasting information	C2	LGIS	MCQs
	Certificates, Reports and other documents			
	Teaching Photography and Consent			
	• Elaborate General ethical 06 basic ethical principles: autonomy, beneficence, non-			
	maleficence & justice.			

• Explain the process of ensuring patient autonomy, beneficence, non-maleficence.		
respect & justice while informing/ deciding on a treatment modality		

# **Integrated Undergraduate Research Curriculum (IUGRC)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
	• How to generate a research question according to FINER Criteria			
How to Generate a	• Formulate the research question according to PICOT format – problem/population, intervention, comparison, outcome and time frame	C3	Hands on	MCQs
Research Question	• To understand how a properly formulated research question is related to an efficient literature review		Session	
	• Development of research protocol including research objectives			
Session on Data Analysis	<ul> <li>Understand statistical methods applicable to medical data.</li> <li>Mastertools for data visualization and interpretation.</li> <li>Develop skills to critically evaluate research findings for their clinical significance and validity.</li> </ul>	C3	Hands on Session	MCQs
Manuscript Writing	<ul> <li>Structure their manuscripts coherently.</li> <li>Employ appropriate scientific language, and adhere to journal guidelines, thereby enhancing their ability to communicate research findings effectively in scholarly publications.</li> </ul>	СЗ	Hands on Session	MCQs

# **Family Medicine**

Topic	Learning Objectives		Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
	Describe presenting complains of patients with Renal failure			
Renal Failure	Disscus complications of Renal failure			
	Descirbe intial treatment of patients with Renal failure	C3	LGIS-1	MCQs
	Know when to refer patient to consultant/ Hospital			

## Entrepreneurship

Topic	Learning Objectives At the end of the lecture the student should be able to		Teaching Strategy	Assessment Tool
	Identify healthcare challenges and develop innovative solutions.	C2		
Ideate Initial Idea	Understand the healthcare market landscape to identify opportunities and assess demand.	C2	LGIS	MCQs
	Describe the ethical implications of healthcare entrepreneurship, including patient privacy and safety.	C2		

### **List of Renal Module Spiral Courses Lectures**

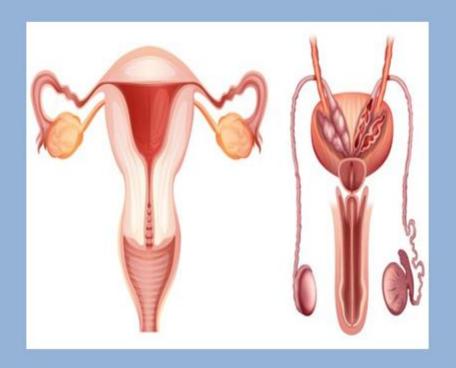
Sr. #	Date/Day	Week	Department	Time	<b>Topic Of Lectures</b>	Teachers Name & Contact #
1.	29-04-2024 MONDAY	2 <sup>nd</sup>	Bioethics	10:30 am – 11:20 am	Ethical principles	Dr. Arsalan (0334-3911629)
2.	30-04-2024	2 <sup>nd</sup>	Research Practical	10:30 am – 11:20 am	Questionnaire	Dr. Khuala Noreen
	TUESDAY		Session II		Development	Dr. Afifa Kalsoom
3.	03-05-2024	2 <sup>nd</sup>	Quran Translation – I	09:20 am – 10:10 am	Imaniat-3	Mufti Naeem Sherazi 0300-5580299
	FRIDAY				Illialliat-3	(Even)
					Ibadaat-3	Dr. Fahd Anwar 0300-5156800 (Odd)
4.	07-05-2024	3 <sup>rd</sup>	Research Practical	10:30am-11:20 am	Session on data	Dr. Khuala Noreen
	TUESDAY		Session III		analysis	Dr. Afifa Kalsoom
5.	10-05-2024	3 <sup>rd</sup>	Quran Translation – II	08:00 am – 09:00 am	Ibadaat-4	Mufti Naeem Sherazi 03005580299
	FRIDAY				Imaniat-4	(Even)
					IIIaiiiat-4	Dr. Fahd Anwar 03005156800 (Odd)
6.	13-05-2024	4 <sup>th</sup>	Research Practical	10:30 am – 11:20 am	Manuscript writing	Dr. Khuala Noreen
	MONDAY		Session IV		Wianuscript writing	Dr. Afifa Kalsoom
7.	14-05-2024	4 <sup>th</sup>	Family Medicine	11:20 am – 12:10 am		Dr. Sidra Hamid (03315025147)
	TUESDAY				Renal Failure	Dr. Sadia
						Mufti Naem Sherazi 03005580299 (Even)



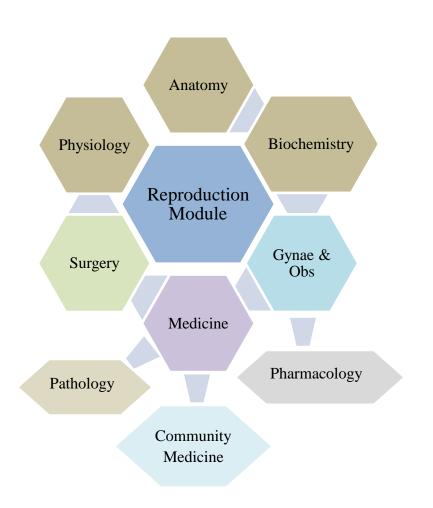
(Reproduction Module + Central Nervous System Module)



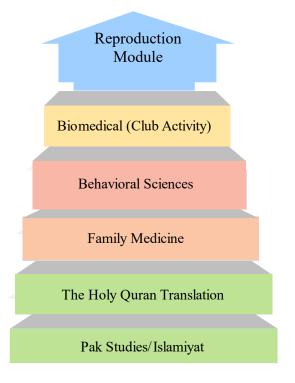
# **Reproduction Module**



### **Integration of Disciplines in Reproduction Module**



### **Spiral / General Education Cluster Courses**



## **Discipline Wise Details of Modular Contents**

Block	Subjects	Embryology	Histology	Gross Anatomy
	• Anatomy	Embryology/Development      Testis     Genital Ducts     Prostate & Accessory     Glands     Uterus & Uterine tubes     Ovary & Vagina	Histology  Testis Genital Ducts Prostate & Accessory Glands Uterus & Uterine Tubes Ovary & Vagina	<ul> <li>Sacrum</li> <li>Bony Pelvis &amp; Joints of Pelvis</li> <li>Pelvic Fascia, Pelvic Diaphragm, &amp; Pelvic Peritoneum</li> <li>Male External Genitalia, Scrotum, &amp; Testis</li> <li>Prostate Vas Deferens, Seminal Vesicles &amp; Ejaculatory Ducts</li> <li>Female External Genitalia, Ovaries, Fallopian Tubes</li> <li>Uterus, Cervix &amp; Vagina</li> <li>Ischioanal Fossa</li> <li>Urogenital Diaphragm</li> <li>Perineum, Superficial Perineal Pouch and its contents</li> <li>Deep Perineal Pouch and its contents</li> <li>Blood Supply &amp; Lymphatic Drainage of Pelvis &amp; Perineum</li> <li>Sacral and Coccygeal Plexus</li> <li>Radiology, Surface Marking</li> </ul>
II	• Biochemistry	<ul> <li>Digestion of nucleic aci</li> <li>Purine catabolism and r</li> <li>Pyrimidine metabolism</li> <li>Regulation of gene expr</li> <li>Male Gonadal Hormone</li> <li>Female Gonadal Hormone</li> </ul>	ression	· · · · · · · · · · · · · · · · · · ·
	• Physiology	<ul> <li>Physiological anatomy of system &amp; spermatogene</li> <li>Physiological anatomy of Semen, capacitation &amp; a</li> <li>Monthly Ovarian Cycle</li> <li>Male sex hormones, Ab</li> <li>function and spermatoge</li> <li>Monthly Endometrial C</li> <li>Response of mother's b</li> </ul>	of male reproductive sis female reproductive system acrosome reaction , ovulation normalities of male sexual enesis ycle and Menstruation ody to pregnancy and parturipestrogen and progesterone)	ition

	Puberty, menarche, menopause, postmenopausal symptoms & anovulatory cycles, Abnormalities of
	<ul> <li>Fuberty, menarche, menopause, postmenopausar symptoms &amp; anovuratory cycles, Adnormanties or</li> <li>secretion by ovaries</li> </ul>
	<ul> <li>Growth &amp;functional development of fetus, Adjustments of infant to extrauterine life, Growth</li> </ul>
	<ul> <li>&amp; development in child</li> </ul>
	<ul> <li>Fertilization of ovum, transport, implantation, Functions of placenta</li> </ul>
	<ul> <li>Hormonal factors in pregnancy, Special functional</li> </ul>
	<ul> <li>problems in neonate. Prematurity and its problems</li> </ul>
	Spiral Courses
Biomedical (Club	Ethical dilemmas Involving breech in Autonomy.
Activity)	<ul> <li>Ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence.</li> </ul>
	• Ethical dilemmas practice involving breach in principle of justice
Behavioural Sciences	• Emotion
Family Medicine	• AIDS
The Holy Quran	• Imaniat-5
Translation	• Akhlaqiat-1
Pak Studies/Islamiyat	Kaamyab logu ki sifaat
	Nehru report, Quaid e Azam k 14 nukaat
	Vertical Integration
Gynae & Obs	Early Pregnancy Complications
	Menstrual irregularities
	• Subfertily
<ul> <li>Pharmacology</li> </ul>	<ul> <li>Hormonal Contraceptives</li> </ul>
Surgery	Male hypogonadism, Acute Scrotum
<ul> <li>Pathology</li> </ul>	BPH/Prostatitis / Sexually Transmitted Diseases
	Polycystic Ovaries
Community Medicine	• Sexually Transmitted Diseases (STDs)
	<ul> <li>Acquired Immunodeficiency Syndromes/ Sexually Transmitted Diseases</li> </ul>
	Early Clinical Exposure
	Ovarian Tumors
	• Uterine Tumors (Gynecology)
Clinical Rotations	Polycystic Ovaries
	• Menstrual Irregularities $\bot$

	<ul> <li>Important points in History of pregnant lady</li> <li>Obstetrics Trimesters</li> <li>Fetal heart sounds</li> </ul> (Obstetrics)
	<ul> <li>Testicular Tumors</li> <li>Hydrocele</li> <li>Undescended Testis</li> <li>Hypospadias/ Epispadias</li> </ul> (Surgery)
	Clinical Themes
<ul><li>Menstural Irregulasities</li><li>PCOS</li></ul>	

### **Reproduction Module Team**

Module Name : Reproduction Module

Duration of module : 04 Weeks

Lectures

14. Focal Person Family Medicine

Coordinator : Dr. Uzma Zafar

Co-coordinator : Dr. Romessa Naeem Reviewed by : Module Committee

Dr. Sadia Khan

	Module Commit	tee		M	odule Task Force Team
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Uzma Zafar (APWMO Demonstrator of Biochemistry)
2.	Director DME	Prof. Dr. Ifra Saeed	2.	DME Focal Person	Dr. Farzana Fatima
3.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	3.	Co-coordinator	Dr. Tariq Furqan (Senior Demonstrator of Anatomy)
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Romessa Naeem (Senior Demonstrator of Biochemistry)
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Nazia (Senior Demonstrator of Physiology)
6.	Focal Person Anatomy Second Year MBBS	Dr. Maria Tasleem			
7.	Focal Person Physiology	Dr. Sidra Hamid		DM	IE Implementation Team
			1.	Director DME	Prof. Dr. Ifra Saeed
8.	Focal Person Biochemistry	Dr. Aneela Jamil	2.	Assistant Director DME	Dr Farzana Fatima
9.	Focal Person Pharmacology	Dr. Zunera Hakim	3.	DME Implementation Team	Prof. Dr. Ifra Saeed
					Dr. Farzana Fatima
					Dr. Saira Aijaz
10.	Focal Person Pathology	Dr. Asiya Niazi	4.	Editor	Muhammad Arslan Aslam
10.					
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir			
11. 12.	Focal Person Behavioral Sciences Focal Person Community Medicine	Dr. Saadia Yasir Dr. Afifa Kulsoom			

### **Module III – Reproduction Module**

**Rationale:** Reproductive system plays an important role in person life although it does not contribute to homeostasis and is not essential for the survival of individual e.g. the manner in which people relate as sexual beings contributes in significant ways to psycosocial behavior and has an important influence on how people view themselves and how they interact with others. Reproductive function also has profound effect on society. The universal organization of societies into family units provide a stable environment that is condusive for perpetuating our species.

#### **Module Outcomes**

By the end of the module, students will be able to:

#### Knowledge

- This module is expected to build students basic knowledge about normal structure, organization, functions and development of reproductive system.
- Used technology based Medical Education including

#### **Artificial Intelligence**

- Appreciate concept and importance of
  - o Family Medicine
  - o Biomedical Ethics
  - Research

#### **Skills**

- Demonstrate effective skill for performing and interpreting various laboratory tests like pregnancy test.
- Demostrate awareness of ethical, legal and social implecation of issues related to bioethics

#### **Attitude**

• Demonstrate professional attitude, team building spirit and good communication specially in small group discussions.

This module will run in 4 weeks duration. Instructional strategies are given in the time table and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self-Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



Syllabus of Reproduction Module-III

## **Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)**

### **Anatomy Large Group Interactive Session (LGIS)**

Topics	At The End Of Lecture Students Should Be Able To:	Learning	Teaching	Assessment
		Domains	Strategy	Tools
Development of testis	<ul> <li>Recall the time of early sex differentiation and genes involved in it.</li> <li>Explain the development of male gonads and formation of testis.</li> <li>Describe the descent of testis.</li> <li>Describe the concepts of chromosomal determination of sex, primordial germ cells and indifferent gonads.</li> <li>Describe histogenesis of interstitial cells of leydig and seminiferous tubules.</li> <li>Correlate with the clinical conditions.</li> <li>Understand curative and preventive heath care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> </ul>	C1 C2 C2 C2 C2 C3 C3 C3 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SAQS</li><li>VIVA</li></ul>
Histology of Testis	<ul> <li>Read relevant research article.</li> <li>Discuss germ cells at different steps of spermatogenesis in the seminiferous tubule.</li> <li>Describe histology of Sertoli cells and Leydig cells.</li> <li>Explain their roles in the production of sperm and regulation of the male reproductive system.</li> <li>Understand the bio-physiological aspects of spermatogenesis.</li> <li>Discuss the related clinicals like orchitis, male infertility, testicular cancers, cryptorchidism.</li> <li>Correlate with the clinical conditions</li> <li>Understand curative and preventive heath care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article</li> </ul>	C2 C2 C2 C2 C3 C3 C3 C3 C3 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SAQS</li><li>VIVA</li></ul>

Histology of male genital ducts	<ul> <li>Describe the histological organization of epididymis, ductus deferens and ejaculatory ducts.</li> <li>Describe the epithelium and microscopic features of epididymis, ductus deferens and ejaculatory ducts.</li> <li>Understand the bio-physiological aspects of epithelium of ducts.</li> <li>Discuss the related clinicals like vasectomy, epididymitis.</li> <li>Understand curative and preventive heath care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article</li> </ul>	C2 C2 C3 C3 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SAQS</li><li>VIVA</li></ul>
Development of male genital ducts, Seminal vesicles and prostate	<ul> <li>Describe the development of male genital ducts during indifferent stage.</li> <li>Discuss development of male genital ducts at advanced stage</li> <li>Describe the molecular regulation of male genital ducts.</li> <li>Describe the development of seminal vehicles.</li> <li>Discuss the development of prostate.</li> <li>Discuss the remnants of mesonephric and paramesonephric ducts in males and their clinical significance.</li> <li>Understand curative and preventive heath care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article.</li> </ul>	C2 C2 C2 C2 C2 C3 C3 C3 C3 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SAQS</li><li>VIVA</li></ul>
Histology of accessory male reproductive glands	<ul> <li>Describe the histological organization of prostate gland, seminal vesicles and bulbourethral glands.</li> <li>Describe microscopic features of these glands.</li> <li>Discuss the related clinicals like prostatitis.</li> <li>Understand curative and preventive heath care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article.</li> </ul>	C2 C2 C2 C3 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SAQS</li><li>VIVA</li></ul>
Development of male	<ul> <li>Explain the different stages and further development of external genitalia.</li> <li>Discuss the related clinical like ambiguous genitalia, Androgen insensitivity syndrome, hypospadias, epispadias, bifid penis, micropenis</li> <li>Understand curative and preventive heath care measures.</li> </ul>	C2 C2 C3	LGIS	• MCQS • SAQS

external genitalia	<ul> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article.</li> </ul>	C3		• VIVA
	Read relevant research article.	C3		
Histology of uterus and uterine tubes	<ul> <li>Recollect knowledge of histological features of endometrium in various phases</li> <li>Discuss microanatomy of layers of uterus</li> <li>Describe parts of uterine tubes</li> <li>Explain microscopic features of all parts of uterine tubes.</li> <li>Dicuss the related clinicals like endometriosis, tubal ligation, salpingitis, and cervical cancers</li> <li>Understand curative and preventive heath care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article.</li> </ul>	C1 C2 C2 C2 C2 C2 C3 C3 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SAQS</li><li>VIVA</li></ul>
Development of uterus and uterine tubes	<ul> <li>Describe role of paramesonephric ducts, uterovaginal primordium in development of uterine tubes</li> <li>Discuss the role of paramesonephric ducts and uterovaginal primordium in the development of uterus.</li> <li>Discuss the related clinicals like bicornuate uterus, unicornuate uterus, double uterus.</li> <li>Understand curative and preventive heath care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article</li> </ul>	C2 C2 C2 C3 C3 C3 C3	LGIS	MCQS     SAQS     VIVA
Histology of Ovary and Vagina	<ul> <li>Discuss the stages of follicular growth (primordial, primary, secondary, tertiary), as well as the changes that occur in the follicular wall.</li> <li>Discuss ovarian cycle and menstrual cycle.</li> <li>Describe the histological features of corpus luteum of mensuration and pregnancy.</li> <li>Discuss the related clinicals like PCOS, Follicular cyst, hemorrhagic cyst.</li> <li>Discuss histological structure of vagina.</li> </ul>	C2 C2 C2 C2 C2	LGIS	<ul><li>MCQS</li><li>SAQS</li><li>VIVA</li></ul>

	<ul> <li>Understand the bio-physiological aspects of vaginal epithelial cells.</li> <li>Discuss the related clinical like vaginitis, squamous cell carcinoma of vagina.</li> <li>Understand curative and preventive heath care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article</li> </ul>	C2 C3 C3 C3 C3 C3		
Development of Ovary	<ul> <li>Recall the process of oogenesis in female.</li> <li>Explain the different steps involved in early oogenesis.</li> <li>Explain the ovarian and menstrual cycle and phases.</li> <li>Explain the hormonal changes occurring during reproductive cycle.</li> <li>Describe role of paramesonephric ducts, uterovaginal primordium in development of ovary</li> <li>Describe the descent of ovaries.</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C1 C2 C2 C2 C2 C2 C3 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SAQS</li><li>VIVA</li></ul>
Development of Vagina	<ul> <li>Discuss the developmental stages of vagina and female external genitalia</li> <li>Enlist different congenital anomalies of female reproductive system.</li> <li>Describe different syndromes and gene defects associated with congenital anomalies</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 C1 C2 C3 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SAQS</li><li>VIVA</li></ul>

## **Physiology Large Group Interactive Session (LGIS)**

Physiological anatomy of male reproductivesyste m & spermatogenesis	At the end of lecture students should be able to:  DescribePhysiological anatomy of male reproductive system Explainthestepsof spermatogenesis Identifytheprocessof meiosis Describethehormonal factors that stimulate spermatogenesis Describefunctionsof seminal vesicles	Learning Domains  C2 C2 C2 C2 C2 C2 C2 C2	Teaching Strategy LGIS	Assessment Tools MCQ SEQ SAQ EMQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition. Function of Male reproductive system (Chapter 23, Page 417)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Reproductive Physiology (Chapter 10. Page 466)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Reproduction and Development (Chapter 26 Page 843,847)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Reproductive and hormonal Functions of the MaleSection 14. (Chapter 81, Page 1011)</li> <li>1. https://teachm ephysiology.c om/reproductive</li> <li>ve- system/embry ology/</li> <li>2. https://www.a nnualreviews. org/doi/abs/10 .1146/annurev .ph.36.030174 .001515?journ alCode=physi ol</li> </ul>
Physiological anatomy female reproductive system	<ul> <li>Describe oogenesis &amp; folliculardevelopmentin ovaries</li> <li>Discussfemalehormonal system</li> </ul>	C2 C2	LGIS	MCQ SEQ SAQ EMQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition. Reproductive development and Function of female reproductive system (Chapter 22, Page 389)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.         Reproductive Physiology (Chapter 10. Page 470)</li> <li>Human Physiology by Dee Unglaub Silver thorn.         8<sup>TH</sup> Edition. Reproduction and Development (Chapter 26 Page 852)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Female Physiology before pregnancy and female hormones. Section 14. (Chapter 82, Page 1027)</li> </ul>

Semen,capacitatio n& acrosome reaction	<ul> <li>Explain capacitation</li> <li>Describe acrosomal reaction</li> <li>Summarize the abnormalities related to spermatogenesis:</li> <li>Bilateral orchitis</li> <li>Effects of temperature</li> <li>Cryptorchidism</li> </ul>	C2 C2 C2	LGIS	MCQ SEQ SAQ EMQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition. Function of Male reproductive system         (Chapter 23, Page 420)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.         Reproductive Physiology (Chapter 10. Page 466)</li> <li>Physiological Basis of Medical Practice by Best         &amp; Taylor's.13<sup>th</sup> Edition. Fertilization, Pregnancy         and Lactation. (Chapter 59, Page 977)</li> <li>Textbook of Medical Physiology by Guyton &amp;         Hall.14<sup>th</sup> Edition.Reproductive and hormonal         Functions of the MaleSection 14. (Chapter 81,         Page 1014)</li> </ul>
MonthlyOvarian Cycle,ovulation	<ul> <li>Describe gonadotropic hormones &amp; their effects on ovaries</li> <li>Explain follicular phase of ovarian cycle</li> <li>Explain ovulation hormones</li> <li>Explain LH surge</li> <li>Describe luteinizing function of Luteinizing</li> </ul>	C2 C2 C2 C2 C2	LGIS	MCQ SEQ SAQ EMQ OSPE VIVA	<ul> <li>Ganong's Review of Medical         Physiology.25<sup>TH</sup> Edition. Reproductive         development and Function of female         reproductive system (Chapter 22, Page 399)</li> <li>Physiological Basis of Medical Practice by         Best &amp; Taylor's.13<sup>th</sup> Edition. The Female         Reproductive System (Chapter 58, Page 959)</li> <li>Textbook of Medical Physiology by Guyton         &amp; Hall.14<sup>th</sup> Edition. Female Physiology         before pregnancy and female         hormones.Section 14.(Chapter 82, Page 1028)</li> <li>https://courses.lu         menlearning.com/         wm-         biology2/chapter/t         he-ovarian-cycle-         the-menstrual-         cycle-and-         menopause/         https://youtu.be         /V9a2AQSJIM         c (Dr Najeeb         Lectures)</li> </ul>
Male sex hormones, Abnormalitiesofm ale sexual function and spermatogenesis system	<ul> <li>Describe male sex hormone's (secretion, metabolism, chemistry, degradation and excretion)</li> <li>Explain functions of testosterone in detail</li> <li>Describe:</li> <li>Hypogonadism in males</li> <li>Interstitial Leydig cell tumors</li> </ul>	C2 C2 C2	LGIS	MCQ SEQ SAQ EMQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition. Function of Male reproductive system         (Chapter 23, Page 421-426)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.         Reproductive Physiology (Chapter 10. Page 467)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.Reproductive and hormonal</li> </ul>

	➤ Erectiledysfunctionin males				Functions of the MaleSection 14. (Chapter 81, Page 101)	5?journalCode=phy siol
MonthlyEndometri al Cycle and Menstruation	<ul> <li>Explain monthly endometrial cycle</li> <li>Explain menstruation &amp; physiological changes in endometrium</li> </ul>	C2 C2	LGIS	MCQ SEQ SAQ EMQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition. Reproductive development and Function of female reproductive system (Chapter 22, Page 399)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.         Reproductive Physiology (Chapter 10. Page 475)</li> <li>Human Physiology by Dee Unglaub Silver thorn.         8<sup>TH</sup> Edition. Reproduction and Development (Chapter 26 Page 853)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Female Physiology before pregnancy and female hormones. Section 14.(Chapter 82, Page 1036)</li> </ul>	1. https://courses.lum enlearning.com/wm = biology2/chapter/th e-ovarian-cycle- the-menstrual- cycle-and- menopause/
Responseofmother 's body to pregnancy, Parturition	<ul> <li>Explain:</li> <li>Anterior pituitarygland secretion</li> <li>Increased corticosteroid secretion</li> <li>Increased thyroidgland secretion</li> <li>Increasedparathyroid gland secretion</li> <li>Explainincreaseduterine excitability near term</li> <li>Explainhormonal factors increasing uterine contractility</li> <li>Discuss mechanical factors increasinguterine contractility</li> </ul>	C2 C2 C2 C2 C2	LGIS	MCQ SEQ SAQ EMQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition. Reproductive development and Function         of female reproductive system (Chapter 22, Page         410,413)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.         Reproductive Physiology (Chapter 10. Page         478,479)</li> <li>Human Physiology by Dee Unglaub Silver thorn.         8<sup>TH</sup> Edition. Reproduction and Development         (Chapter 26 Page 863)</li> <li>Physiological Basis of Medical Practice by Best         &amp; Taylor's.13<sup>th</sup> Edition. Fertilization, Pregnancy         and Lactation. (Chapter 59, Page 994)</li> <li>Textbook of Medical Physiology by Guyton &amp;         Hall.14<sup>th</sup> Edition.Pregnancy and</li> </ul>	1. https://teachmephys iology.com/reprodu ctive-system/ 2. https://zerotofinals. com/obgyn/reprodu ctivesystem/physiol ogyinpregnancy/ 3. https://www.scienc edirect.com/science /article/abs/pii/S00 1502822200485X

	<ul> <li>Explainthephysiological mechanism of labour</li> </ul>				Lactation.Section 14.(Chapter 82, Page 1045,1052)	
Female sex hormones (estrogen and progesterone)	<ul> <li>Explain:</li> <li>Functions of estradiol &amp; progesterone</li> <li>Chemistry of sex hormones</li> <li>Synthesis of estrogen &amp; progesterone</li> </ul>	C2	LGIS	MCQ SEQ SAQ EMQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition. Reproductive development and Function of female reproductive system (Chapter 22, Page 404)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.         Reproductive Physiology (Chapter 10. Page 472)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Female Physiology before pregnancy and female hormones.Section 14.(Chapter 82, Page 1032)</li> </ul>	phys ocri lam or-
Lactation, Milk composition,breast feeding	<ul> <li>Explaindevelopment of breasts</li> <li>Explainhormonal control of breast development</li> <li>Describe the role of prolactininal ctation</li> <li>Explain:</li> <li>Milkletdown reflex</li> <li>Milk composition</li> <li>Metabolic drainin mother caused by lactation</li> </ul>	C2 C2 C2 C2	LGIS	MCQ SEQ SAQ EMQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.26<sup>TH</sup>         Edition. Reproductive development and Function of female reproductive system (Chapter 22, Page 414)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Female Physiology before pregnancy and female hormones.Section 14.(Chapter 82, Page 1056-1059)</li> <li>https://rupress.ogp/article/5/4/44 0794/THE-RAT OF-DECLINE-0 MILK-SECRETION-WITH-THE</li> <li>https://rupress.ogp/article/5</li></ul>	41/3 ΓΕ- ΟF- nual /abs
Puberty, menarche, menopause, postmenopausal symptoms & anovulatory cycles, Abnormalities of secretion by ovaries	<ul> <li>Discussthephysiology of:</li> <li>Puberty</li> <li>Menarche</li> <li>Menopause</li> <li>Explainhypogonadism</li> <li>Describeamenorrhea</li> <li>Describehypersecretion by ovaries</li> </ul>	C2 C2 C2	LGIS	MCQ SEQ SAQ EMQ OSPE VIVA	<ul> <li>Ganong's Review of Medical Physiology.26<sup>TH</sup>         Edition. Reproductive development and Function of female reproductive system (Chapter 22, Page 396,398,408)</li> <li>Textbook of Medical Physiology by Guyton &amp; MENARCHE.         aspx         Hall.14<sup>th</sup> Edition. Female Physiology before pregnancy and female hormones.Section 14.(Chapter 82, Page 1040)</li> <li>https://journals.1.com/clinicalobs/Citation/1977/06/0/PUBERTY_A_MENARCHE.</li> <li>aspx</li> <li>https://journals.1.com/clinicalobs/Citation/1977/06/0/PUBERTY_A_MENARCHE.</li> <li>aspx</li> <li>https://www.glo.com/section-view/heading/Ptology%20of%20</li> </ul>	gyn/ 1900 AND 111.

Fertilization of ovum, transport, implantation	<ul> <li>Describe:</li> <li>Entry of ovum into fallopian tube</li> <li>Transport of fertilized ovum</li> <li>Implantation of blastocyst</li> </ul>	C2	LGIS	MCQ SEQ	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition. Reproductive development and Function of female reproductive system (Chapter 22, Page 410)     </li> <li>Physiological Basis of Medical Practice by Best</li> </ul>	berty/item/285#.ZC KTtXZBzIU  1. https://teachmephys iology.com/reprodu ctive-system/ 2. https://my.clevelan dclinic.org/health/a rticles/11585-
Functions of placenta	<ul> <li>Early nutrition of embryo</li> <li>Describe physiological anatomy of placenta</li> <li>Explain placental permeability</li> <li>Explain diffusion of gases &amp; excretion of waste products</li> </ul>	C2 C2 C2		SAQ EMQ VIVA	<ul> <li>&amp; Taylor's.13<sup>th</sup> Edition. Fertilization, Pregnancy and Lactation. (Chapter 59, Page 975)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Pregnancy and Lactation .Section 14. (Chapter 83, Page 1045)</li> </ul>	<u>conception</u>
Growth &functional developmentoffetu s, Adjustmentsofinfa nt to extrauterine life, Growth & development in child	<ul> <li>Describedevelopmentof organ system in fetus</li> <li>Explainfetalmetabolism</li> </ul>	C2 C2	LGIS	MCQ SEQ SAQ EMQ VIVA	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Physiology of Pregnancy (Chapter 60, Page 998)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition. Fetal and Neonatal Physiology. Section 14. (Chapter 84, Page 1061-1065)</li> </ul>	1.https://youtu.be/ rYVGjbzmAtg 2.https://www.msdm anuals.com/home/ women-s-health- issues/normal- pregnancy/stages- of-development-of- the-fetus
Hormonal factors in pregnancy, Special functionalproblem sin neonate. Prematurity and its problems	<ul> <li>ExplainfunctinsofB- HCG</li> <li>Describesecretionof estrogens by the placenta</li> <li>Summarizefunctionof estrogen in pregnancy</li> <li>Summarizefunctionof progesterone in pregnancy</li> <li>Explainonsetof breathing</li> </ul>	C2 C2 C2 C2 C2 C2 C2 C2 C2	LGIS	MCQ SEQ SAQ EMQ OSPE VIVA	Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition. Physiology of Pregnancy (Chapter 60, Page 998)  Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> Edition. Fetal and Neonatal Physiology. Section 14. (Chapter 84, Page 1066-1070)	1. https://teachmephys iology.com/reprodu ctive-system/ 2. https://patient.info/ pregnancy/prematu re-babies

Describethecauseof			
breathing at birth			
• Explain delayed /			
abnormalbreathingat birth			
Describechangesto			
hypoxia			

## **Biochemistry Large Group Interactive Session (LGIS)**

Topics	At the end of lecture students should be able to:	Learning Domains	Teaching Strategy	Assessment Tools
Male gonadal hormones	Synthesis mechanism of action and functions of male gonadal hormones	C2	LGIS	MCQ SEQ VIVA
Female gonadal hormones	Synthesis mechanism of action and functions of female gonadal hormones	C2	LGIS	MCQ SEQ VIVA
Digestion of nucleic acid and purine synthesis	<ul> <li>Explain digestion of nucleoprotein</li> <li>Describe purine biosynthesis (Denovosynthesis and salvage pathway)</li> </ul>	C2 C2	LGIS	MCQ SEQ VIVA
Purine catabolism and related disorders	<ul><li>Explain purine catabolism</li><li>Discuss related disorders</li></ul>	C2 C3	LGIS	MCQ SEQ VIVA
Pyrimidine metabolism	<ul><li>Explain Pyrimidine catabolism</li><li>Related disorders</li></ul>	C2 C3	LGIS	MCQ SEQ VIVA
Regulation of gene expression	Explain the regulation of gene expression	C2	LGIS	MCQ SEQ VIVA

### **Anatomy Small Group Discussion (SGDs)**

Topics	At The End Of Demonstration Student Should Be Able To	Learning Domains	Teaching Strategy	Assessment Tools
Sacrum	<ul> <li>Identify the bone</li> <li>Place the bone in anatomical position</li> <li>Demonstrate anatomical features on bone</li> <li>Discuss attachments and relations on bone</li> <li>Discuss important clinical anatomy of bone</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 P P C2 C3 C3 C3 C3 C3	Skill Lab	<ul><li>MCQS</li><li>SAQS</li><li>OSPE</li><li>VIVA</li></ul>
Bony pelvis	<ul> <li>Identify type of pelvis</li> <li>Place pelvis in anatomical position</li> <li>Demonstrate different diameters of each type</li> <li>Differentiate bony features of each type</li> <li>Clinical importance of each type</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 P P C1 C3 C3 C3 C3 C3	Skill Lab	<ul><li>MCQS</li><li>SAQS</li><li>OSPE</li><li>VIVA</li></ul>
Pelvic Peritoneum and its contents	<ul> <li>Identify visceras present in pelvis</li> <li>Demonstrate peritoneal reflections on pelvic visceras</li> <li>Discuss pouches formed by peritoneum</li> <li>Discuss clinical anatomy of pelvic peritoneum and pelvic visceras</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> </ul>	C2 P C2 C3 C3 C3 C3 C3	Skill Lab	<ul><li>MCQS</li><li>SAQS</li><li>OSPE</li><li>VIVA</li></ul>

	Read a relevant research article			
Pelvic diaphragm	<ul> <li>Identify the muscles forming pelvic diaphragm</li> <li>Demonstrate the attachments and nerve supply of muscles of pelvic diaphragm</li> <li>Locate the structures piercing the pelvic diaphragm</li> <li>Discuss clinical anatomy of pelvic diaphragm</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 P C2 C2 C3 C3 C3 C3	Skill Lab	<ul><li>MCQS</li><li>SAQS</li><li>OSPE</li><li>VIVA</li></ul>
Male external genitalia	<ul> <li>Identify the anatomical structures of external genitalia</li> <li>Demonstrate anatomical position of testis</li> <li>Enlist layers of scrotum with its neurovasculature</li> <li>Discuss clinical anatomy of scrotum</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 P C1 C3 C3 C3 C3 C3	Skill Lab	<ul><li>MCQS</li><li>SAQS</li><li>OSPE</li><li>VIVA</li></ul>
Testis	<ul> <li>Identify the structure</li> <li>Demonstrate anatomical position of testis</li> <li>Discuss layers and structure of testis</li> <li>Discuss important clinical anatomy related to testis</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 P C2 C3 C3 C3 C3 C3	Skill Lab	• MCQs • SAQs • OSPE • VIVA

Male genital	<ul> <li>Describe the anatomical position of vas deferens, seminal vesicles, ejaculatory ducts on model</li> <li>Discuss the anatomical relations of vas deferens, seminal</li> </ul>	C2 C2	Skill Lab	• MCQs
ducts	<ul> <li>vesicles, ejaculatory ducts</li> <li>Discuss clinical anatomy</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> </ul>	C3 C3 C3		• SAQs • OSPE • VIVA
	<ul> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C3 C3		
Prostate	<ul> <li>Identify the position of prostate</li> <li>Demonstrate the anatomical features and relations of prostate</li> <li>Discuss clinical anatomy</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 P C3 C3 C3 C3 C3	Skill Lab	• MCQs • SAQs • OSPE • VIVA
Ovaries	<ul> <li>Identify the site of ovarian fossa</li> <li>Discuss anatomical relations of ovary</li> <li>Discuss neurovasculature and hormonal effects of ovaries</li> <li>Discuss important clinical anatomy of ovary</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C1 C2 C2 C3 C3 C3 C3 C3	Skill Lab	• MCQs • SAQs • OSPE • VIVA
Fallopian tubes, Uterus	<ul> <li>Identify the location of structures in pelvis</li> <li>Demonstrate anatomical relations of these structures</li> <li>Discuss normal positions of uterus with its ligaments</li> <li>Discuss its neurovasculature</li> <li>Discuss important clinical anatomy of fallopian tubes, uterus and uterine tube</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C1 P C2 C2 C3 C3 C3 C3 C3	Skill Lab	• MCQs • SAQs • OSPE • VIVA

	Discuss anatomy of cervix	C2		
	<ul> <li>Describe anatomical relations of cervix</li> </ul>	C2		• MCQs
Cervix	Describe its neurovasculature	C2	Skill Lab	• SAQs
	Understand curative and preventive heath care measures	C3		• OSPE
	<ul> <li>Practice the principles of bioethics.</li> </ul>	C3		
	Apply strategic use of A.I in health care	C3		• VIVA
	Read a relevant research article	C3		
	Discuss the dimensions, boundaries and recesses	C2		
	<ul> <li>Describe the contents of Ischio anal fossa</li> </ul>	C2		• MCQs
Ischio-anal fossa	Describe pudendal canal and its contents	C2	Skill Lab	• SAQs
	Discuss important clinical anatomy of structures	C3		_
	<ul> <li>Understand curative and preventive heath care measures</li> </ul>	C3		• OSPE
	<ul> <li>Practice the principles of bioethics.</li> </ul>	C3		• VIVA
	<ul> <li>Apply strategic use of A.I in health care</li> </ul>	C3		
	Read a relevant research article	C3		
	Discuss the formation of diaphragm	C2		
	1 0	C2 C1		1.600
Urogenital	Identify the relations and contents of diaphragm	C2	Skill Lab	• MCQs
diaphragm	Discuss organs piercing urogenital diaphragm	C3	SKIII Lao	• SAQs
diapinagin	Discuss important clinical anatomy related to diaphragm	C3		• OSPE
	Understand curative and preventive heath care measures	C3		• VIVA
	<ul> <li>Practice the principles of bioethics.</li> </ul>	C3		
	Apply strategic use of A.I in health care	C3		
	Read a relevant research article			
	<ul> <li>Identify boundaries and divisions of perineum</li> </ul>	C1		
	<ul> <li>Discuss formation of perineal pouches</li> </ul>	C2		• MCQs
Perineum &	• Discuss in detail the contents of superficial perineal pouches in	C2	Skill Lab	• SAQs
Superficial	male and female	G2		• OSPE
perineal pouches	<ul> <li>Discuss important clinical anatomy related to superficial</li> </ul>	C3		• VIVA
	perineal pouches	C2		• VIVA
	<ul> <li>Understand curative and preventive heath care measures</li> </ul>	C3		
	<ul> <li>Practice the principles of bioethics.</li> </ul>	C3		
	Apply strategic use of A.I in health care	C2		
	Read a relevant research article	C3		
		C3		

Deep perineal pouches	<ul> <li>Discuss in detail the contents of deep perineal pouches in male and female</li> <li>Discuss important clinical anatomy related to deep perineal pouches.</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 C3 C3 C3 C3 C3	Skill Lab	• MCQs • SAQs • OSPE • VIVA
Blood supply of pelvis and perineum	<ul> <li>Identify major blood vessels &amp; nerves of pelvis and perineum</li> <li>Demonstrate anatomical relationships</li> <li>Describe important clinical anatomy related to blood vessels of pelvis and perineum</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C1 P C3 C3 C3 C3 C3	Skill Lab	• MCQs • SAQs • OSPE • VIVA
Lymphatic drainage of pelvis and perineum	<ul> <li>Identify major lymphatic vessels of pelvis and perineum</li> <li>Discuss lymphatic drainage of pelvis and perineum</li> <li>Discuss important clinical anatomy</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C1 C2 C2 C3 C3 C3 C3	Skill Lab	• MCQs • SAQs • OSPE • VIVA
Sacral and Coccygeal plexus	<ul> <li>Identify various branches of sacral and coccygeal plexus</li> <li>Discuss anatomical relations</li> <li>Describe root values of each branch of plexus and its related applied</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C1 C2 C2 C3	Skill Lab	• MCQs • SAQs • OSPE • VIVA

Radiology	<ul> <li>Describe the radiological appearance of pelvis and perineum on</li> <li>Interpret normal radiographs</li> <li>Read ultrasound uterus for gestation/feotus</li> <li>Describe Hysterosalpangigraphy</li> <li>Understand curative and preventive heath care measures</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 C3 C3 C3 C3 C3 C3 C3 C3	Skill Lab	• MCQs • SAQs • OSPE • VIVA
Cross Sectional Anatomy	<ul> <li>Identify different structures of male pelvis at different levels; S5, coccyx, Symphysis pubis, ischial tuberosity, anal verge</li> <li>Identify different structures of female pelvis at different levels; S5, coccyx, Symphysis pubis, ischial tuberosity, anal verge</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 C2 C3 C3 C3 C3	Skill Lab	<ul><li>MCQs</li><li>SAQs</li><li>OSPE</li><li>VIVA</li></ul>

## **Physiology Small Group Discussion (SGDs)**

Topics	At the end of discussion students should be able to:	Learning Domains	Teaching Strategy	Assessment Tools
Infertility	Correlate basic knowledge with clinical application	C3	CBL	MCQ SEQ VIVA
Menorrhagia	Correlate basic knowledge with clinical application	СЗ	CBL	MCQ SEQ VIVA
Neonatal problems of Prematurity	Correlate basic knowledge with clinical application	СЗ	SGD	MCQ SEQ VIVA

## **Biochemistry Small Group Discussion (SGDs)**

Topics	At the end of tutorial students should be able to	Learning	Teaching	Assessment
		<b>Domains</b>	Strategy	Tools
	Purine denovo synthesis and describe salvage pathway	C2		
Purine metabolism	Read a relevant research article	C3	SGD	MCQ
	Use digital library	C3		SEQ
	, and the second			VIVA
	Synthesis, mechanism of action and functions of male	C2		
Male female sex	female gonadal hormones	C3	SGD	MCQ
hormones	Read a relevant research article	C3		SEQ
	Use digital library			VIVA

## **Anatomy Self Directed Learning (SDL)**

Topics	Learning objectives	Learning Resources
Sacrum	<ul> <li>Identify the bone</li> <li>Place the bone in anatomical position</li> <li>Demonstrate anatomical features on bone</li> <li>Discuss attachments and relations on bone</li> <li>Discuss important clinical anatomy of bone</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 4, Page 451).</li> <li><a href="https://www.youtube.com/watch?v=93c9nlxbMUw">https://www.youtube.com/watch?v=93c9nlxbMUw</a></li> <li><a href="https://www.youtube.com/watch?v=PuOE-PI1eps">https://www.youtube.com/watch?v=PuOE-PI1eps</a></li> </ul>
Bony pelvis	<ul> <li>Identify type of pelvis</li> <li>Place pelvis in anatomical position</li> <li>Demonstrate different diameters of each type</li> <li>Differentiate bony features of each type</li> <li>Clinical importance of each type</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 327-337).</li> <li><a href="https://www.youtube.com/watch?v=yK-8ZwLFare">https://www.youtube.com/watch?v=yK-8ZwLFare</a></li> <li><a href="https://www.youtube.com/watch?v=3v5AsAESg1Q">https://www.youtube.com/watch?v=3z0xBCyxb3y</a></li> <li><a href="https://www.youtube.com/watch?v=3Z0XBCyXb3y">https://www.youtube.com/watch?v=3Z0XBCyXb3y</a></li> </ul>
Pelvic Peritoneum and its contents	<ul> <li>Identify visceras present in pelvis</li> <li>Demonstrate peritoneal reflections on pelvic visceras</li> <li>Discuss pouches formed by peritoneum</li> <li>Discuss clinical anatomy of pelvic peritoneum and pelvic visceras</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 338-349).</li> <li><a href="https://www.youtube.com/watch?v=F2-5tX_CMlQ">https://www.youtube.com/watch?v=3Z0XBCyXb3Y</a></li> <li>https://www.youtube.com/watch?v=3Z0XBCyXb3Y</li> </ul>
Pelvic diaphragm	<ul> <li>Identify the muscles forming pelvic diaphragm</li> <li>Demonstrate the attachments and nerve supply of muscles of pelvic diaphragm</li> <li>Locate the structures piercing the pelvic diaphragm</li> <li>Discuss clinical anatomy of pelvic diaphragm</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 338-349).</li> <li><a href="https://www.youtube.com/watch?v=P3BBAMWm2Eo">https://www.youtube.com/watch?v=P3BBAMWm2Eo</a></li> <li><a href="https://www.youtube.com/watch?v=3Z0XBCyXb3Y">https://www.youtube.com/watch?v=3Z0XBCyXb3Y</a></li> </ul>

Male external genitalia	<ul> <li>Identify the anatomical structures of external genitalia</li> <li>Demonstrate anatomical position of testis</li> <li>Enlist layers of scrotum with its neurovasculature</li> <li>Discuss clinical anatomy of scrotum</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 418-419).</li> <li><a href="https://www.youtube.com/watch?v=ai7MjQvenKs">https://www.youtube.com/watch?v=ai7MjQvenKs</a></li> <li><a href="https://www.youtube.com/watch?v=5eHvZ2gyR1Y">https://www.youtube.com/watch?v=N66sAZH1VA8</a></li> </ul>
Testis	<ul> <li>Identify the structure</li> <li>Demonstrate anatomical position of testis</li> <li>Discuss layers and structure of testis</li> <li>Discuss important clinical anatomy related to testis</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 2, Page 208-215).</li> <li><a href="https://www.youtube.com/watch?v=ai7MjQvenKs">https://www.youtube.com/watch?v=ai7MjQvenKs</a></li> <li><a href="https://www.youtube.com/watch?v=5eHvZ2gyR1Y">https://www.youtube.com/watch?v=N66sAZH1VA8</a></li> </ul>
Male genital ducts	<ul> <li>Describe the anatomical position of vas deferens, seminal vesicles, ejaculatory ducts on model</li> <li>Discuss the anatomical relations of vas deferens, seminal vesicles, ejaculatory ducts</li> <li>Discuss clinical anatomy</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 376 -381).</li> <li><a href="https://www.youtube.com/watch?v=N66sAZH1VA8">https://www.youtube.com/watch?v=ai7MjQvenKs</a></li> <li><a href="https://www.youtube.com/watch?v=ai7MjQvenKs">https://www.youtube.com/watch?v=ai7MjQvenKs</a></li> </ul>
Prostate	<ul> <li>Identify the position of prostate</li> <li>Demonstrate the anatomical features and relations of prostate</li> <li>Discuss clinical anatomy</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 376 -381).</li> <li><a href="https://www.youtube.com/watch?v=93Ayq248u_8">https://www.youtube.com/watch?v=ai7MjQvenKs</a></li> <li><a href="https://www.youtube.com/watch?v=ai7MjQvenKs">https://www.youtube.com/watch?v=ai7MjQvenKs</a></li> </ul>
Ovaries	<ul> <li>Identify the site of ovarian fossa</li> <li>Discuss anatomical relations of ovary</li> <li>Discuss neurovasculature and hormonal effects on ovaries</li> <li>Discuss important clinical anatomy of ovary</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 391-392).</li> <li><a href="https://www.youtube.com/watch?v=AREHaMls9Y4">https://www.youtube.com/watch?v=AREHaMls9Y4</a></li> <li><a href="https://www.youtube.com/watch?v=2tOtIqSNqbc">https://www.youtube.com/watch?v=2tOtIqSNqbc</a></li> </ul>

Fallopian tubes, Uterus	<ul> <li>Identify the location of structures in pelvis</li> <li>Demonstrate anatomical relations of these structures</li> <li>Discuss normal positions of uterus with its ligaments</li> <li>Discuss its neurovasculature</li> <li>Discuss important clinical anatomy of fallopian tubes, uterus and uterine tube</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 385-390, 392-399).</li> <li><a href="https://www.youtube.com/watch?v=AREHaMls9Y4">https://www.youtube.com/watch?v=AREHaMls9Y4</a></li> <li><a href="https://www.youtube.com/watch?v=PMI-iJwNt3Y">https://www.youtube.com/watch?v=PMI-iJwNt3Y</a></li> <li><a href="https://www.youtube.com/watch?v=2tOtIqSNqbc">https://www.youtube.com/watch?v=2tOtIqSNqbc</a></li> </ul>
Cervix	<ul> <li>Discuss anatomy of cervix</li> <li>Describe anatomical relations of cervix</li> <li>Describe its neurovasculature blood</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 385-390, 392-399).</li> <li><a href="https://www.youtube.com/watch?v=AREHaMls9Y4">https://www.youtube.com/watch?v=PMI-iJwNt3Y</a></li> <li><a href="https://www.youtube.com/watch?v=PMI-iJwNt3Y">https://www.youtube.com/watch?v=PMI-iJwNt3Y</a></li> </ul>
Ischio-anal fossa	<ul> <li>Discuss the dimensions, boundaries and recesses</li> <li>Describe the contents of Ischio anal fossa</li> <li>Describe pudendal canal and its contents</li> <li>Discuss important clinical anatomy of structures</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 409-411, 416).</li> <li><a href="https://www.youtube.com/watch?v=SFq0hA3PwK4">https://www.youtube.com/watch?v=SFq0hA3PwK4</a></li> <li><a href="https://www.youtube.com/watch?v=K4K3a8UnS5M">https://www.youtube.com/watch?v=K4K3a8UnS5M</a></li> </ul>
Urogenital diaphragm	<ul> <li>Discuss the formation of diaphragm</li> <li>Identify the relations and contents of diaphragm</li> <li>Discuss organs piercing urogenital diaphragm</li> <li>Discuss important clinical anatomy related to diaphragm</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 406-408).</li> <li><a href="https://www.youtube.com/watch?v=edI7knFSu_k">https://www.youtube.com/watch?v=edI7knFSu_k</a></li> <li><a href="https://www.youtube.com/watch?v=ZaIRPhXavVg">https://www.youtube.com/watch?v=ZaIRPhXavVg</a></li> </ul>
Perineum & Superficial perineal pouches	<ul> <li>Identify boundaries and divisions of perineum</li> <li>Discuss formation of perineal pouches</li> <li>Discuss in detail the contents of superficial perineal pouches in male and female</li> <li>Discuss important clinical anatomy related to superficial perineal pouches</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 402-405).</li> <li><a href="https://www.youtube.com/watch?v=GegidLpxW9A">https://www.youtube.com/watch?v=GegidLpxW9A</a></li> <li><a href="https://www.youtube.com/watch?v=OwWk6tqsW8o">https://www.youtube.com/watch?v=OwWk6tqsW8o</a></li> </ul>

Deep perineal pouches	<ul> <li>Discuss in detail the contents of deep perineal pouches in male and female</li> <li>Discuss important clinical anatomy related to deep perineal pouches.</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 406-409, 414).</li> <li><a href="https://www.youtube.com/watch?v=q0Ax3rLFc6M">https://www.youtube.com/watch?v=q0Ax3rLFc6M</a></li> <li><a href="https://www.youtube.com/watch?v=OwWk6tqsW8o">https://www.youtube.com/watch?v=OwWk6tqsW8o</a></li> </ul>
Blood supply of pelvis and perineum	<ul> <li>Identify major blood vessels &amp; nerves of pelvis and perineum</li> <li>Demonstrate anatomical relationships</li> <li>Describe important clinical anatomy related to blood vessels of pelvis and perineum</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 350-357, 361).</li> <li><a href="https://www.youtube.com/watch?v=xYu56Luwdls">https://www.youtube.com/watch?v=xYu56Luwdls</a></li> <li><a href="https://www.youtube.com/watch?v=o4TplbDDcj8">https://www.youtube.com/watch?v=o4TplbDDcj8</a></li> </ul>
Lymphatic drainage of pelvis and perineum	<ul> <li>Identify major lymphatic vessels of pelvis and perineum</li> <li>Discuss lymphatic drainage of pelvis and perineum</li> <li>Discuss important clinical anatomy</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 400-402).</li> <li><a href="https://www.youtube.com/watch?v=F-Ba96V0R-c">https://www.youtube.com/watch?v=F-Ba96V0R-c</a></li> <li><a href="https://www.youtube.com/watch?v=o4TplbDDcj8">https://www.youtube.com/watch?v=o4TplbDDcj8</a></li> </ul>
Sacral and Coccygeal plexus	<ul> <li>Identify various branches of sacral and coccygeal plexus</li> <li>Discuss anatomical relations</li> <li>Describe root values of each branch of plexus and its related applied</li> <li>Read a relevant research article</li> </ul>	<ul> <li>Clinical Oriented Anatomy by Keith L. Moore.6TH Edition. (Chapter 3, Page 357-361).</li> <li><a href="https://www.youtube.com/watch?v=DZ0IL1tHNxo">https://www.youtube.com/watch?v=DZ0IL1tHNxo</a></li> <li><a href="https://www.youtube.com/watch?v=f7Zig8eBCqY">https://www.youtube.com/watch?v=JqUleDnXuEI</a></li> </ul>

## Physiology Self Directed Learning (SDL)

Topics Of SDL	Learning Objectives	Learning resources
Fertilization of ovum, transport, implantation, Functions of placenta	<ul> <li>Maturation and fertilization of ovum</li> <li>Transport and Implantation</li> <li>Early nutrition of the Embryo</li> <li>Functions of Placenta</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.         Reproductive development and Function of female reproductive system (Chapter 22, Page 410)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>         Edition. Fertilization, Pregnancy and Lactation. (Chapter 59, Page 975)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.</li> <li>Pregnancy and Lactation. Section 14. (Chapter 83, Page 1045)</li> <li><a href="https://teachmephysiology.com/reproductive-system/">https://teachmephysiology.com/reproductive-system/</a></li> <li>https://my.clevelandclinic.org/health/articles/11585- conception</li> </ul>
Growth &functional development of fetus, Adjustments of infant to extrauterine life, Growth & development in child	<ul> <li>Growth &amp; functional development of fetus</li> <li>Fetal Metabolism</li> <li>Changes in Fetal circulation at Birth Adjustment of the Infant to the Extrauterine life</li> </ul>	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>         Edition. Physiology of Pregnancy (Chapter 60, Page 998)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup>         Edition. Fetal and Neonatal Physiology. Section 14.         (Chapter 84, Page 1061-1065)         <ul> <li><a href="https://youtu.be/rYVGjbzmAtg">https://youtu.be/rYVGjbzmAtg</a></li> <li><a href="https://www.msdmanuals.com/home/women-s-">health-issues/normal-pregnancy/stages-of-development- of-the-fetus"&gt;https://www.msdmanuals.com/home/women-s-</a> health-issues/normal-pregnancy/stages-of-development- of-the-fetus</li> </ul> </li> </ul>
Hormonal factors in pregnancy, Special functional problems in neonate. Prematurity and its problems.	<ul> <li>Special functional problems in neonate</li> <li>Prematurity</li> <li>Immature development of the premature Infant</li> <li>Instability of Homeostasis in Premature Infant         Instability of body temperature in Infants     </li> </ul>	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup>         Edition. Physiology of Pregnancy (Chapter 60, Page 998)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition.         Fetal and Neonatal Physiology. Section 14. (Chapter 84, Page 1066-1070)         <ul> <li>https://teachmephysiology.com/reproductive-system/</li> <li>https://patient.info/pregnancy/premature-babies</li> </ul> </li> </ul>

## **Biochemistry Self Directed Learning (SDL)**

Topics Of SDL	Learning Objectives	Learning resources
Male gonadal hormones	Synthesis mechanism of action and functions of male gonadal hormones	<ul> <li>Text Book of Harper,32 edition (chapter 41 page – 487-488)</li> <li><a href="https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/gonad-function">https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/gonad-function</a> </li> <li><a href="https://www.youtube.com/watch?v=A5u_TY1A0t8">https://www.youtube.com/watch?v=A5u_TY1A0t8</a> </li> <li>Use digital library</li> <li><a href="https://www.ncbi.nlm.nih.gov/books/NBK29/">https://www.ncbi.nlm.nih.gov/books/NBK29/</a></li> </ul>
Female gonadal hormones	Synthesis mechanism of action and functions of female gonadal hormones	Text Book of Harper,32 edition (chapter 41 page – 487-488) <ul> <li>https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/gonad-functionn</li> <li>https://www.youtube.com/watch?v=A5u_TY1A0t8</li> <li>Use digital library</li> <li>https://www.ncbi.nlm.nih.gov/books/NBK29/</li> </ul>
Introduction to nucleic acid and purine synthesis	<ul> <li>Digestion of nucleoprotein</li> <li>Understand whole purine synthesis (Denovo and salvage pathway)</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 22, page 292-295)</li> <li><a href="https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/purine-synthesis">https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/purine-synthesis</a> </li> <li><a href="https://www.youtube.com/watch?v=VXWyWzbigrg">https://www.youtube.com/watch?v=VXWyWzbigrg</a> </li> <li>Use digital library</li> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3243375/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3243375/</a></li> </ul>
Purine catabolism	<ul> <li>Explain purine catabolism</li> <li>Discuss related disorder</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 22, page 298-301)</li> <li><a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/purine-metabolism-disorder">https://www.sciencedirect.com/topics/medicine-and-dentistry/purine-metabolism-disorder</a> </li> <li><a href="https://www.youtube.com/watch?v=e2KFVvI8Akk">https://www.youtube.com/watch?v=e2KFVvI8Akk</a> </li> <li>Use digital library</li> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4215161/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4215161/</a></li> </ul>

Pyrimidine metabolism	Explain Pyrimidine catabolism and related disorders	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 22, page 302-304)</li> <li><a href="https://www.cliffsnotes.com/study-guides/biology/biochemistry-ii/purines-and-pyrimidines/pyrimidine-metabolism">https://www.cliffsnotes.com/study-guides/biology/biochemistry-ii/purines-and-pyrimidines/pyrimidine-metabolism</a> </li> <li><a href="https://www.youtube.com/watch?v=n7Uec8Jtr4E">https://www.youtube.com/watch?v=n7Uec8Jtr4E</a> </li> <li>Use digital library</li> <li><a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC378357/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC378357/</a> </li> </ul>
Regulation of gene expression	Explain the regulation of gene expression	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 22, page 465-477)</li> <li>https://www.healio.com/hematology-oncology/learn-genomics/genomics-primer/regulation-of-gene-expression-in-eukaryotes</li> <li>https://www.youtube.com/watch?v=J9jhg90A7Lw</li> <li>Use digital library</li> <li>https://www.nature.com/scitable/topicpage/regulation-of-transcription-and-gene-expression-in-1086/</li> </ul>

## **Histology Practicals Skill Laboratory (SKL)**

Topics	At The End of Demonstration Student Should Be Able To	Learning	Teaching	Assessment
		Domains	Strategy	Tools
Testis, epididymis, ductus deferens	<ul> <li>Identify the histological slide of testis, ductus deferens and epididymis</li> <li>Illustrate the microscopic picture of testis, ductus deferens</li> </ul>	P C2	Skill Lab	OSPE
ductus deferens	<ul><li>and epididymis</li><li>Enlist two points of identification of each</li></ul>	C1		
	<ul><li>Read relevant research article</li><li>Use digital library</li></ul>	C3 C3		
	<ul> <li>Identify the histological slide of seminal vesicles and prostate</li> <li>Illustrate the microscopic picture of seminal vesicles and</li> </ul>	P C2	Skill Lab	OSPE
Seminal vesicles, prostate	<ul> <li>prostate</li> <li>Enlist two points of identification of each</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	C1 C3 C3		
Ovary	<ul> <li>Identify the histological slide of ovary</li> <li>Illustrate the microscopic picture of ovary</li> <li>Enlist two points of identification</li> <li>Read relevant research article</li> <li>Lieu digital library</li> </ul>	P C2 C1 C3	Skill Lab	OSPE
Uterus, uterine tubes	<ul> <li>Use digital library</li> <li>Identify the histological slide of Uterus and uterine tubes</li> <li>Illustrate the microscopic picture of Uterus and uterine tubes</li> <li>Enlist two points of identification of each</li> <li>Read relevant research article</li> </ul>	C3 P C2 C1 C3	Skill Lab	OSPE
	Use digital library	C3		

## **Physiology Practicals Skill Laboratory (SKL)**

Practicals	At The End Of This Skill Lab, Student Should Be Able To Illustrate:	Learning Domains	Teaching Strategy	Assessment Tools
Examination of 7 <sup>th</sup> Cranial nerve	<ul> <li>Principle</li> <li>Procedure</li> <li>Clinical correlation</li> <li>Overview of Cranial nerves</li> <li>Performance of student</li> <li>Apparatus identification</li> </ul>	C1 P3 C3 C1 P3	Skill lab	OSPE
Pregnancy Test	<ul> <li>Principle</li> <li>Procedure</li> <li>Precautions</li> <li>Recall types of pregnancy test</li> <li>Performance of student</li> </ul>	C1 P3 C1 C1 P3	Skill lab	OSPE
Examination of 3 <sup>rd</sup> ,4th,6 <sup>th</sup> cranial nerves	<ul> <li>Principle</li> <li>Procedure</li> <li>Clinical correlation of reflexes</li> <li>Overview of cranial nerves</li> </ul>	C1 P3 C3 C1	Skill lab	OSPE

## **Biochemistry Practicals Skill Laboratory (SKL)**

Topics	At the End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Estimation of uric acid	Perform estimation of uric acid by spectrophometer	P	Skill Lab	OSPE
Estimation of Cholestrol	Estimation of cholesterol by spectrophometer	P	Skill Lab	OSPE
Milk analysis	Protein, carbohydrates, lipid detection	P	Skill Lab	OSPE

## **Basic and Clinical Sciences (Vertical Integration)**

### Content

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

## **Case Based Learning Objectives (CBL)**

Subjects	Topics	At the end of the session the student should be able to	Learning Domains
	Prostatic Hyperplasia	Apply basic knowledge of subject to study clinical case.	C3
Anatomy	Ovarian Cyst	Apply basic knowledge of subject to study clinical case.	C3
	Infertility	Apply basic knowledge of subject to study clinical case.	C3
Physiology	Menorrhagia	Apply basic knowledge of subject to study clinical case.	C3
	Neonatal problems of Prematurity	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	Gout	Apply basic knowledge of subject to study clinical case.	C3

## **Problem Base Learning (PBL)**

Subject	Topic	Learning Objectives	Learning
		At the end of the lecture the student should be able to	Domain
PBL	Pregnancy	Apply basic knowledge of subject to study clinical case.	C3
1 DL	• PCOS	Apply basic knowledge of subject to study clinical case.	C3

# Vertical Integration LGIS Pathology

Topics	At the end of lecture students of should be able	Learning	Teaching	Assessment
	to:	<b>Domains</b>	Strategy	Tools
Sexually transmitted diseases	<ul> <li>Enumerate the STDs</li> <li>Describe the pathogenesis of syphilis and gonorrhea</li> </ul>	C1 C2	LGIS	MCQ's
BPH/Prostatitis	<ul> <li>Define benign prostatic hyperplasia</li> <li>Briefly discuss the morphological features of BPH &amp; prostatitis</li> </ul>	C1 C2	LGIS	MCQ's
Polycystic ovaries	Define the polycystic ovaries     Describe the pathophysiology of polycystic ovaries	C1 C2	LGIS	MCQ's

## **Community Medicine**

Topics	At the end of lecture students of should be able to:	Learning Domains	Teaching Strategy	Assessment Tools
Sexually Transmitted Diseases		Domains	Strates,	20025
Definition	Define STD and its various factors	C1		
Problem statement	Discuss the problem statement of STD worldwide.	C2		
Types of STDs	<ul> <li>Enumerate different types of STDs</li> </ul>	C1		
Host factors related to STDs	<ul> <li>Discuss all host factors responsible for STDs</li> </ul>	C2	LGIS	MCQ,
Demographic factors	• Discuss in detail role of demographic factors in STD spread.	C2		2,
Social factors role	Role of social factors in STDs	C2		
Intervention strategies.	<ul> <li>Role of intervene on strategies and planning in control of STDs</li> </ul>	C2		
AIDS	Discuss In detail the definition of AIDS	C2		
Problem statement of AIDS and HIV	<ul> <li>Discuss in detail the problem statement of HIV n AIDs.</li> <li>Its impact on underdeveloped eloped world.</li> <li>understanding the gravity of the situation.</li> </ul>	C2		
Risk factors	Discuss the key risk factors in HIV responsible.	C2	LGIS	MCQ
Agent and other biological determinants	<ul> <li>Explain agent details</li> <li>Describe the effect of agent stability and its biological determinants</li> </ul>	C2		
Host, reservoir of infection and transmission details	Detailed discussion on the host factors, reservoir of infection and transmission factors responsible.	C2		
Symtomology, treatment and prevention of AIDs and HIV	• Discuss in detail the symptomology, treatment and prevention of AIDS and HIV .	C2		

## Surgery

Topics	At The End Of Lecture, Students Should Be Able To:	Learning Domains	Teaching Strategy	Assessment Tools
Male hypogonadism	<ul> <li>Discuss pathophysiology, signs and symptoms of male hypogonadism</li> <li>Describe altered hormonal levels in male hypogonadism</li> <li>Outline treatment plan for breast tumors</li> </ul>	C2 C2 C1	LGIS	MCQ
Undescended Testes	<ul> <li>Define UDT</li> <li>Define Retractile Testes</li> <li>Define Ectopic Testes</li> <li>Causes of UDT/Ectopic Testes</li> <li>Differentiate between UDT and Retractile Testes</li> <li>Management plan</li> </ul>	C1 C1 C1 C2 C2 C2	LGIS	MCQ
Acute Scrotum	<ul> <li>Enumerate the causes of acute scrotum</li> <li>Describe Torsion, orchitis, epididymorchitisetc</li> <li>Differentiate between Torsion and Epididymorchitis</li> <li>Describe the approach towards diagnosis of acute scrotum</li> </ul>	C1 C2 C2 C2	LGIS	MCQ

## Obstetrics & Gynaecology

Topics	At the end of lecture students should be able to:	Learning	Teaching	Assessment
		<b>Domains</b>	Strategy	Tool
	• Understand ovarian and endometrial changes during normal	C2		
Menstrual irregularity	menstrual cycle	C2		
due to anovulation	• Describe the process of ovulation under the effect of LH	C2	LGIS	MCQs
	Describe causes of anovulation	C2		
	Describe effects of anovulation	C1		
	• Enumerate the tests for confirmation of ovulation			

## **List of Reproduction Module Vertical Courses Lectures**

Sr. #	Date/Day	Week	Department	Time	Topic Of Lectures	Facilitators Names And Contact Numbers
1.	30-05-2024 Thursday	1 <sup>st</sup>	Gynae And Obs	11:20am – 12:10 Pm	Early Pregnancy Complications	
2.	31-05-2024 Friday	1 <sup>st</sup>	Pharmacology	11:00am – 12:00pm	Hormonal Contraceptives	
3.	03-06-2024 Monday	2 <sup>nd</sup>	Surgery	11:20am – 12:10pm	Male hypogonadism Acute Scrotum	Dr. Mariyam (Even) Dr. Faraz (Odd
4.	04-06-2024 Tuesday	2 <sup>nd</sup>	Pathology	11:20am – 12:10pm	Sexually transmitted diseases BPH/Prostatitis	Dr Abid Hassan (Even) Dr Rabbiya Khalid (Odd)
5.	05-06-2024 Wednesday	2 <sup>nd</sup>	Pathology	11:20am – 12:10pm	BPH/ Prostatitis Sexually transmitted diseases	Dr Abid Hassan (Odd) Dr Rabbiya Khalid (Even)
6.	06-06-2024 Thursday	2 <sup>nd</sup>	Surgery	11:20am – 12:10pm	Undescended Testes	Dr. Rameez (Even) Dr. Ameen (Odd)
7.	10-06-2024 Monday	3 <sup>rd</sup>	Pathology	10:30am – 11:20am	Polycystic ovaries	Dr Tayaba Ali (Even) Dr. Aasiya Niazi (Odd)
8.	11-06-2024 Tuesday	3 <sup>rd</sup>	Community Medicine	10:30am – 11:20am	Sexually Transmitted Diseases (STDs) Acquired immunodeficiency syndromes (AIDs)	Dr. Rizwan (Even) Dr. Asif (Odd)
9.	11-06-2024 Tuesday	3 <sup>rd</sup>	Gynae And Obs	11:20am – 12:10pm	Menstrual irregularities	Dr Shama Bashir (Even) Dr. Saira Ahmed (Odd)
10.	12-06-2024 Wednesday	3 <sup>rd</sup>	Community Medicine	11:20am – 12:10pm	Acquired immunodeficiency syndromes (AIDs) Sexually Transmitted Diseases (STDs)	Dr. Asif (Even) Dr. Rizwan (Odd)
11.	15-06-2024 Saturday	3 <sup>rd</sup>	Gynae And Obs	10:30am – 11:20am	Subfertility	

## **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

### Content

- Longitudinal Themes
  - o The Holy Quran Translation
  - o Pak Studies/Islamiyat Biomedical (Club Activity)
  - o Family Medicine
  - o Behavioral Sciences
  - o Early Clinical Exposure (ECE)

## **The Holy Quran Translation Lecture**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Imaniat-5	Quate Example of Shrik from Surrah Ul Hajj	C1	LGIS	MCQs
	Define Truth and Righteousness	C1	LGIS	MCQs
Akhlaqiat-1	Describe Truth and Righteousness with help of Quranic	C2	LGIS	MCQs
	Verses			

## Pak Studies/Islamiyat

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
Kaamyab Logu Ki Sifaat	Describe Qualities of Successful People with the help of Quranic Verses and Sunnah	C2	LGIS	MCQs
Nehru report, Quaid e Azam k 14 nukaat	Descirbe Nehru Report and fourteen points of Quaid e Azam	C2	LGIS	MCQs

## Family Medicine

Topic	At The End Of Lecture, Students Should Be Able To:	Learning	Teaching	Assessment
		Domain	Strategy	Tools
	<ul> <li>Discuss pathophysiology, signs and symptoms of patients with</li> </ul>	C1		
	HIV	C2		
AIDS	Discuss the diagnostic criteria	C2	LGIS	MCQs
	<ul> <li>Discuss the complications</li> </ul>	C2		
	<ul> <li>Discuss the management of disease and its complications.</li> </ul>			

## **Behavioural Sciences**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At the end of the lecture the student should be able to	Domain	Strategy	Tool
	To define emotions.			
	• To explain the neuroanatomy and neurochemistry of			
Emotion	emotion	C3	I CIG	MGO
	• To handle situations with heightened emotions		LGIS	MCQs
	encountered in			
	<ul> <li>daily life and clinical practice</li> </ul>			

## **Biomedical (Club Activity)**

Topics	At the end of session students should be able to:	Learning	Teaching Strategy	Assessment Tools
Ethical dilemmas in healthcare practice involving breach in principle of autonomy	<ul> <li>Analyze ethical dilemmas in healthcare practice involving breach in principle of autonomy.</li> <li>Explain what procedures adopted to maintain patient autonomy.</li> <li>Identify situations in which doctor may have to take decisions in the best interest of the patients</li> </ul>	C3 C2 C1	Short video demonstration on violation of Ethical principle of autonomy from suit CBEC Video resources	<ul> <li>Assignment based assessment involving real life case scenarios under aggregate         Marks.</li> <li>(Internal Assessment)</li> <li>Assignment to be uploaded on LMS</li> </ul>
Ethical dilemmas in healthcare practice involving breach in principle of beneficence and nonmaleficence	<ul> <li>Analyze ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence.</li> <li>Explain what procedures adopted to maintain the principle of beneficence and non-maleficence in challenging situations.</li> <li>Identify situations in which a doctor may have to take decisions in the best interests of the patient considering the principle of beneficence and non-maleficence</li> </ul>	C3 C2 C1	Short video demonstration on violation of Ethical principle of beneficence and non-maleficence from suit CBEC Video resources Students deliberations and reflections Reflective writing	<ul> <li>Assignment based assessment involving real life case scenarios under aggregate Marks</li> <li>(Internal Assessment)</li> <li>Assignment to be uploaded on LMS</li> </ul>

Ethical dilemmas	Analyze ethical dilemmas in healthcare practice involving breach in principle of justice.	C3 C2	Short video demonstration on violation of Ethical	Assignment based assessment involving
practice involving breach in principle of justice	<ul> <li>Explain what procedures adopted to maintain the principle of justice in challenging situations.</li> <li>Identify situations in which a doctor may have to take decisions in the best interests of the patient considering the principle of justice</li> </ul>	C1	principle of beneficence and non-maleficence from suit CBEC Video resources Students deliberations and reflections Reflective writing	real life case scenarios under aggregate Marks (Internal Assessment)  • Assignment to be uploaded on LMS

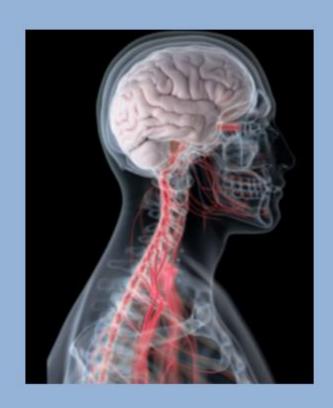
## **List of Reproduction Module Spiral Courses Lectures**

<b>Sr.</b> #	Date/Day	Week	Department	Time	Topic Of Lectures	<b>Facilitators Names And Contact Numbers</b>
1.	31-05-2024 Friday	1 <sup>st</sup>	Quran Translation - I	08:00am – 09:00 Am	Imaniat-5/ Akhlaqiat-1	Mufti Naeem (0300-5580299) Dr. Fahd (0300-5156800)
2.	31-05-2024 Friday	1 <sup>st</sup>	Pak Studies/Islamiyat	09:00am – 10:00am	Kaamyab Logu Ki Sifaat / Nehru Report, Quaid E Azam K 14 Nukaat	Mufti Naeem (0300-5580299) Qari Aman (0346-7598528)
3.	07-06-2024 Friday	2 <sup>nd</sup>	Biomedical (Club Activity)	10:00am – 12:00pm	Ethical Dilemmas Involving Breech In Autonomy	
4.	10-06-2024 Monday	3 <sup>rd</sup>	Behavioural Sciences	11:20am – 12:10pm	Emotion	
5.	12-06-2024 Wednesday	3 <sup>rd</sup>	Biomedical Ethics	10:30am – 11:20am	Ethical Dilemmas In Healthcare Practice Involving Breach In Principle Of Beneficence And Non- Maleficence	
6.	13-06-2024 Thursday	3 <sup>rd</sup>	Biomedical Ethics	10:30am – 11:20am	Ethical dilemmas practice involving breach in principle of justice	
7.	14-06-2024 Friday	3 <sup>rd</sup>	Quran Translation – II	08:00am – 09:00am	Imaniat-6 Akhlaqiat-2	Dr. Fahd Anwar (Odd) Mufti Naeem Sherazi (Even
8.	14-06-2024 Friday	3 <sup>rd</sup>	Pak Studies/Islamiyat	09:00am – 10:00am	Nehru Report, Quaid E Azam K 14 Nukaat/ Kaamyab Logu Ki Sifaat	Qari Aman (0346-7598528) Mufti Naeem (0300-5580299)
9.	15-06-2024 Saturday	3 <sup>rd</sup>	Family Medicine	11:20am – 12:10pm	AIDS	Dr Shaheer(Even) Dr Shabaz Ashraf (Odd)

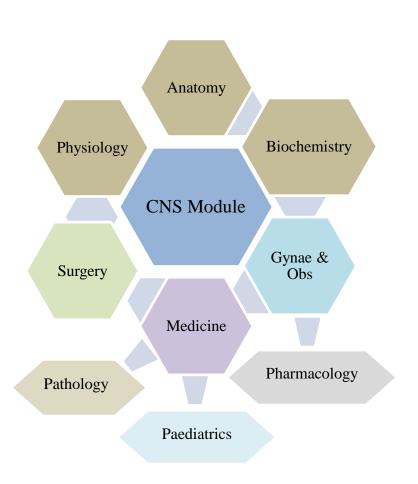


## Rawalpindi Medical University Department of Medical Education (DME)

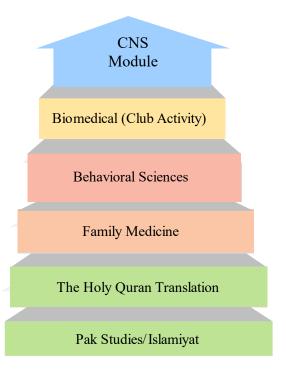
## **Central Nervous System Module**



## **Integration of Disciplines in CNS Module**



## **Spiral / General Education Cluster Courses**



## **Discipline Wise Details of Modular Contents**

Subjects	Embryology	Histology	General Anatomy	Gross Anatomy
• Anatomy	<ul> <li>Early CNS Development</li> <li>Spinal Cord</li> <li>Hindbrain &amp; Cerebellum</li> <li>Midbrain</li> <li>Forebrain</li> <li>Peripheral Nervous System</li> </ul>	<ul> <li>Ganglia</li> <li>Peripheral Nerves</li> <li>Spinal Cord</li> <li>Cerebellum</li> <li>Cerebrum</li> </ul>	<ul> <li>General Anatomy</li> <li>General Anatomy of Nervous System</li> <li>General Anatomy of Autonomic Nervous System.</li> </ul>	<ul> <li>Anterior, Middle &amp; Posterior cranial fossae</li> <li>Meninges, Dural venous sinuses, and intracranial hemorrhages</li> <li>Spinal cord &amp; Tracts</li> <li>Brain stem (Medulla oblongata, Pons, cerebellum &amp; Midbrain)</li> </ul>
				<ul> <li>Diencephalon</li> <li>Cerebrum</li> <li>CSF and Ventricular System</li> <li>Cranial nerves</li> <li>Basal ganglia</li> <li>Limbic system &amp; Reticular formation</li> <li>Blood Supply of Brain</li> <li>Radiological Imaging of CNS</li> <li>Cross Sectional Anatomy of CNS</li> </ul>
Biochemistry	<ul> <li>Fatty acid metabolism</li> <li>Cholesterol Metabolism</li> <li>Ketone bodies metabolism</li> <li>Lipoproteins and Phospho</li> <li>Fatty Liver and hyper Lip</li> <li>Glycerophospholipid &amp; S</li> </ul>	olipids idemias.		
• Physiology	<ul> <li>Organization of nervous s</li> <li>Classification of sensory n</li> <li>Properties of synaptic trans</li> <li>Physiology of pain, Dual</li> <li>Sensory pathways for trans</li> </ul>	receptors, Properties of assission pathway for transmission	f sensory receptors ion of pain, Analgesia System and Therr	nal sensations

	Letter duration to contain any constaint Pagis Characteristics of commethatic for grant and the first in
	• Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function
	Somatosensory cortex & lesions of Somatosensory cortex
	Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation
	CSF, Blood brain barrier, Blood CSF Barrier, Lumber puncture
	Concept of Association areas,
	Concept of Dominant and non-dominant cerebral hemispheres
	• Limbic system,
	• Functions of hypothalamus
	Speech and aphasia
	Learning and memory
	Reticular activating system and sleep
	EEG and epilepsy
	• Introduction to motor nervous system & Reflex action, Conditioned reflexes & Properties of reflex action, Control of spinal cord reflexes by higher centers
	Introduction to cerebellum, Neuronal circuits of cerebellum, and its motor functions
	Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity
	Spiral Courses
The Holy Quran	• Imaniyaat-5
Translation	• Imaniyaat-6
	Momalat-I
	Momalat-II
Pak Studies / Islammiyat	Musawat
	• Tehreek-e-Pakistan (1940-1947)
	Khwateen k hakook
	Qayam e Pakistan, Ibtidai Mushkilaat
Bioethics &	Ethical dilemmas in healthcare practice involving breach in principle of autonomy
Professionalism	• Ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence
	• Ethical dilemmas practice involving breach in principle of justice
Radiology & Artificial	Skull radiograph
Intelligence	CT Scan & MRI
Family Medicine	Approach to a patient with headache
Behavioral Sciences	• Emotions
	Memory
	Vertical Integration
Pharmacology	Introduction to CNS

Pathology	Patterns of injury in nervous system     Moningities
D. II	Meningitis
<ul> <li>Pediatrics</li> </ul>	• Meningitis
	Cerebral palsy, Polio
• Surgery	Spinal injury and head injury
	Management of hydrocephalus
	Brain abscess
	Polytrauma patient
Medicine	Spinal cord and peripheral nervous system
	• Encephalitis
	Cerebellar disorders
	Epilepsy and other convulsive disorders
	• Stroke
<ul> <li>Gynecology &amp; Obs</li> </ul>	Seizures during pregnancy (eclampsia/ epilepsy)
	Early Clinical Exposure (ECE)
Medicine	Cases of stroke
	• Paraplegia
	Vegetative state
<ul> <li>Surgery/ Neurosurgery</li> </ul>	Head injury.
	Nerve injuries
<ul> <li>Radiology</li> </ul>	• CT scan
	• Brain
	• Normal
	• Stroke
	Hemorrhage
	Infarction Hydrocephalus
	Brain atrophy
	Brain Edema
	Skull/ spine Fractures
	MRI Brain/ Spine
	Clinical Themes
Meningitis	
• Epilepsy and other convulsiv	ve disorders

### **CNS Module Team**

Module Name : CNS Module
Duration of module : 06 Weeks

Coordinator : Dr. Arsalan Manzoor Mughal

Dr. Sadia Khan

Co-coordinator : Dr. Gaiti Ara

Lectures

14. Focal Person Family Medicine

Reviewed by : Module Committee

Module Committ	ee			Module Task Force Team
1. Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Arsalan Manzoor Mughal (Associate Professor of
				Anatomy)
2. Director DME	Prof. Dr. Ifra Saeed	2.	DME Focal Person	Dr. Farzana Fatima
3. Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf	3.	Co-coordinator	Dr. Gaiti Aara ((APWMO of Anatomy)
4. Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Rahat (Senior Demonstrator of Biochemistry)
5. Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Shazia (Senior Demonstrator of Physiology)
6. Focal Person Anatomy Second Year	Dr. Maria Tasleem			·
7. Focal Person Physiology	Dr. Sidra Hamid		D	ME Implementation Team
, , ,		1.	Director DME	Prof. Dr. Ifra Saeed
8. Focal Person Biochemistry	Dr. Aneela Jamil	2.	Assistant Director DME	Dr Farzana Fatima
9. Focal Person Pharmacology	Dr. Zunera Hakim	3.	DME Implementation Team	Prof. Dr. Ifra Saeed
				Dr. Farzana Fatima
				Dr. Saira Aijaz
10. Focal Person Pathology	Dr. Asiya Niazi	4.	Editor	Muhammad Arslan Aslam
11. Focal Person Behavioral Sciences	Dr. Saadia Yasir			
12. Focal Person Community Medicine	Dr. Afifa Kulsoom			
12. Pocar reison Community Medicine	Di. Hilla Raisooni			

### Module IV - CNS Module

**Rationale:** The human nervous system is the most complex and versatile achievement of the process of evolution. The nervous system of all animals functions to detect changes in the external and internal environment and to bring about appropriate responses in the muscles, organs and glands.

The anatomical, physiological, biochemical and molecular foundation of some of these aspects of neural function are well understood, while others continue to occupy the professional lives of many thousands of researchers in both the basic and clinical sciences.

The nervous system is often damaged by inherited or developmental abnormalities by disease processes and by traumatic injury. The prevention, diagnosis and management of neurological disorders are therefore of immense socioeconomic importance.

This module is expected to build the student's basic knowledge about the normal structure, organization, functions and development of nervous system. This knowledge, skills and attitudes acquired will serve as a fabric on which the student will weave further knowledge about the etiology, pathology and pathogenesis of diseases of nervous system and the principles of their management.

#### **Module Outcomes**

By the end of the module, students will be able to:

#### Knowledge

- Describe the development, structure, functions and biochemical processes of the nervous system.
- Briefly describe the injuries and diseases of the nervous system such as Alzheimer's disease, Parkinson's Disease, etc.
- Classify the main drug groups actin on the nervous system.
- Identify the medical conditions related to nervous system such as stroke, cerebellar disorders, meningitis etc.
- Identify the surgical conditions related to the nervous system such as head injury brain tumors and abscesses.
- Identify obstetrical conditions related to nervous system such as preeclampsia.
- Identify pediatric conditions related to nervous system such as meningitis, cerebral palsy and polio.
- Identify parts of the CNS on radiographs CT scans and MRIs.
- Identify ENT and ophthalmological conditions such as acoustic neuroma and strabismus.

- Describe aspects of behavioral sciences such as Emotions and Memory.
- Used technology based Medical Education including Artificial Intelligence.
- Appreciate concept and importance of Biomedical Ethics, & Research.

### **Skills**

- Demonstrate dissection and identification of various parts of the nervous system.
- Identify, draw and label histological slides of the nervous system.
- Perform examination of sensory system, motor system, special senses and cranial nerves.
- Demonstrate effective skill for performing estimation of cholesterol, triglycerides and HDL.
- Demonstrate awareness of ethical, legal and social implication of issues related to bioethics

#### **Attitude**

• Demonstrate professional attitude, team building spirit and good communication specially in small group discussions.

This module will run in 6 weeks duration. Instructional strategies are given in the time table and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

## **Learning Objectives, Teaching Strategies & Assessments**

### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self-Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



## **Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)**

## **Anatomy Large Group Interactive Session (LGIS)**

Topic	At The End Of The Session Student Should Be Able To		<b>Teaching</b>	Assessment
		A	Strategy	Tool
	• Discuss the major divisions of nervous system	C2		
<b>General Anatomy</b> Nervous System	Differentiate between neurons and neuroglia	C2		
	• List the neuroglia and their functions	C1		
	• Describe myelination of nerve fibers	C2		MGO
	• Describe the structure of a peripheral nerve and reflex action	C2	LGIS	MCQs SAQs
	Describe degeneration and regeneration of nerves	C2	LUIS	SEQs
	• Correlate with the clinical conditions & cross sections.	C3		VIVA
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
	• Describe the process of development of neurocranium and viscerocranium	C2		
	• Describe formation of neural tube, neuropores and their closure	C2		MCQs SAQs
	• Describe histogenesis and Cytodifferentiation within the neural tube.	C2		
Embryology	• Describe the brain flexures and their derivatives	C2	I CIG	
Early development of Skull & Central	• Describe role of neuroblasts forming efferent and afferent rows.	C2	LGIS	
Nervous System	• Correlate with the clinical conditions & cross sections.	C3		SEQs VIVA
rici vous system	• Understand curative and preventive health care measures.	C3		VIVA
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		

Embryology Development of spinal	• Describe the significance of ventricular, mantle and marginal layers of developing spinal cord.	C2	LGIS	MCQs SAQs
cord	• Enumerate derivatives of alar and basal plates in developing spinal cord.	C1		SEQs
	• Describe the process of myelination of nerve fibers.	C2		VIVA
	• Describe role of neural crest cells in development of spinal ganglia.	C2		
	• Explain positional changes of spinal cord.	C2		
	• Discuss congenital anomalies due to neural tube defects and abnormal histogenesis.	C3		
	• Correlate with the clinical conditions & cross sections.	C3		
	Understand curative and preventive health care measures.	C3		
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	• Read relevant research article.	C3		
	Enlist the components of peripheral and autonomic system.	C1		
	Tabulate differences between sympathetic and parasympathetic nervous systems	C2		
General Anatomy	Describe effects of sympathetic and parasympathetic nervous systems on various parts of the body	C2		MCQs SAQs SEQs VIVA
Autonomic Nervous System	<ul> <li>Discuss the anatomical basis of autonomic injuries such as Horner's syndrome,         Urinary bladder dysfunction, rectal distention, Erectile dysfunction are argyll         Robertson pupil.</li> </ul>	C3	LGIS	
	Correlate with the clinical conditions & cross sections.	C3		
	Understand curative and preventive health care measures.	C3		
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Describe the histological structure of meninges and choroid plexus	C2		
	Discuss the histological structure of Myelinated and unmyelinated nerve fibers	C2		
Histology	Discuss the histological structure of sensory and autonomic ganglia	C2		MCQs
Meninges, Choroid Plexus, Peripheral Nervous system and ganglia	Discuss the principles of neuroplasticity and regeneration	C2	LGIS	SAQs
	Correlate with the clinical conditions & cross sections.	C3		SEQs VIVA
	Understand curative and preventive health care measures.	C3		VIVA
gangna	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
<b>Embryology</b>	Describe the development of Myelencephalon.	C2	LGIS	MCQs

Development of	Describe the arrangement of neuroblasts in metencephalon	C2		SAQs
Rhombencephalon	Describe the development of metencephalon.	C2		SEQs
	Describe the arrangement of neuroblasts in metencephalon	C2		VIVA
	Describe the development of cerebellum	C2		
	Correlate with the clinical conditions & cross sections.	C3		
	Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Describe the histological structure of spinal cord	C2		
	Describe the histological structure of cerebellum	C2		MCQs
Histology	Discuss cells in each layer along with its histological morphology	C2	LGIS	SAQs
Spinal Cord and	• Correlate with the clinical conditions & cross sections.	C3		SEQs
Cerebellum	Understand curative and preventive health care measures.	C3		VIVA
	• Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Describe the development of mesencephalon	C2		
	Describe the arrangement of neuroblasts in mesencephalon	C2		
	Describe the development of mesencephalon	C2		
	• Describe the arrangement of neuroblasts in mesencephalon	C2		MGO
Embryology	Describe the development of pituitary gland	C2	I CIC	MCQs
Development Mesencephalon and	• Discuss the anatomical basis of pharyngeal hypophysis and craniopharyngiomas	C3	LGIS	SAQs SEQs
Prosencephalon	• Discuss the anatomical basis of birth defects such as encephalocele,	C3		VIVA
Trosencepharon	microencephaly, microcephaly, Chiari malformation.			V1V11
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Describe the histological structure of cerebrum	C2		
Histology	• Correlate with the clinical conditions & cross sections.	C3	LGIS	MCQs
Cerebrum	Understand curative and preventive health care measures.	C3		SAQs
	• Practice the principles of bioethics.	C3		SEQs

	Apply strategic use of A.I in health care.	C3		VIVA
	Read relevant research article.	C3		
	Describe the development cranial nerves	C2		
	<ul> <li>Describe the development of spinal nerves</li> </ul>	C2		
Embryology	Describe the development of sympathetic nervous system	C2		MCQs
Development of	Describe the development of parasympathetic nervous system	C2	LGIS	SAQs
peripheral and autonomic nervous	Correlate with the clinical conditions	C3		SEQs VIVA
	• Understand curative and preventive health care measures.	C3		VIVA
system	• Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
Embryology	• Describe the development of different steps of cartilaginous and membranous viscero cranium and neuro-cranium.	C2		
Development of	Discuss the postnatal growth of the cranium	C2		MCQs
Cranium	Correlate with the clinical conditions.	C3	LGIS	SAQs
	Understand curative and preventive health care measures.	C3		SEQs
	• Practice the principles of bioethics.	C3		VIVA
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		

## **Physiology Large Group Interactive Session (LGIS)**

Topic	At The End Of This LGIS, Second Year MBBS	Learning	Teaching	Assessment	References	Learning
	Students Should Be Able To:	Objectives	Strategy	Tools		Resources
	Describe the general organization of nervous system	C1			Ganong's Review of Medical	
	Describe major levels of CNS functions	C1	LGIS	MCQ	Physiology.25TH Edition.	1-44 // 4 1 /
Organization of Nervous	• Briefly explain nerve fiber structure, classification &	C2		SEQ	Central and Peripheral	• https://youtu.be/
System	properties			VIVA	Neurophysiology Section 02	432AD7JZnKE
Mechanism of synaptic	Describe labeled line principle	C1			(Chapter 08, Page 168)	https://www.osmosi
transmission	Define synapse	C1			Physiology by Linda S.	s.org/learn/Somatos
	Enumerate & compare types of synapses	C2			Costanzo 6th Edition.	ensory_pathways
	Describe process of synaptic transmission	C1			Neurophysiology (Chapter	

	Enumerate the important neurotransmitters of nervous system	C1			03. Page 82) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 48, Page 601,609)	
	Enumerate & explain different types of sensory receptors according to function	C1			Ganong's Review of Medical Physiology.25TH Edition.	
Classification of sensory	Enumerate & explain different types of sensory receptors according to location	C2		MCQ	Central and Peripheral Neurophysiology Section 02	
receptors	Enlist various properties of sensory receptors	C1	LGIS	SEQ	(Chapter 08, Page 168)	• <a href="https://youtu.be/">https://youtu.be/</a>
Properties of sensory receptors	Describe mechanism of signal transduction & generation of receptor potential	C1		VIVA	Physiology by Linda S.     Costanzo 6th Edition.	432AD7JZnKE https://www.osmosi
	Describe mechanism of adaptation of different types of receptors	C1			Neurophysiology (Chapter 03. Page 82)	s.org/learn/Somatos ensory_pathways
	Describe the properties of sensory receptors	C1			Textbook of Medical	
	Describe the types and characteristics of tactile receptors	C1			Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 48, Page 601,609)	
Properties of synaptic	Briefly explain the electrical events during neuronal excitation and inhibition	C2	LGIS	MCQ	Ganong's Review of Medical Physiology.25TH Edition.	
transmission	Explain temporal and spatial summation	C1		SEQ	Central and Peripheral	
	Enlist & explain various characteristics of synaptic transmission	C1		VIVA	Neurophysiology Section 02 (Chapter 08, Page 168) • Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03. Page 82) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 48, Page 601,609)	• https://youtu.be/ 432AD7JZnKE https://www.osmosi s.org/learn/Somatos ensory_pathways
D	• Define pain	C1				
Physiology of pain	• Enumerate different types of pain	C2				
Dual pathway for	Tabulate the differences between two types of pain	C1	I CIC	MCO		
transmission of pain Analgeia System	Describe characteristics of pain receptors     Discuss the mechanism of stimulation of pain receptors	C1 C2	LGIS	MCQ SEQ VIVA		

	Compare and contrast neospinothalamic & paleo spinothalamic tract	C2				
Thermal Sensations	Define referred pain	C1	1			
	Explain the mechanism of referred pain	C2				
	Give examples of referred pain	C1				
	Describe visceral pain and its causes	C1				
	Define headache	C1				
	Enlist the types of headache & their causes	C1	]			
	Explain the analgesia system	C2				
	Describe thermal receptors	C1				
	Explain mechanism of excitation of thermal receptors	C2				
	Describe transmission of thermal signals in nervous system	C1				
	Classify somatic senses	C2			Ganong's Review of Medical	• https://youtu.be/
	Describe the sensory pathways for	C1			Physiology.25TH Edition.	432AD7JZnKE
Sensory pathways for	transmission of somatic sensations to central			MCQ	Central and Peripheral	https://www.osmosi
transmitting somatic	nervous system		LGIS	SEQ	Neurophysiology Section 02	s.org/learn/Somatos
signals	Enumerate sensations carried by dorsal column system and anterolateral system	C1		VIVA	<ul><li>(Chapter 08, Page 168)</li><li>Physiology by Linda S.</li></ul>	ensory_pathways
	Describe the characteristics of transmission in the	C1			Costanzo 6th Edition.	
	dorsal column medial lemniscal system and anterolateral system				Neurophysiology (Chapter 03. Page 82)	
	Compare and contrast dorsal column medial	C2			Textbook of Medical	
	lemniscal system and anterolateral system				Physiology by Guyton &	
					Hall.14th Edition. Section	
					09.(Chapter 48, Page 601,609)	
	Describe general organization of autonomic nervous	C1			Ganong's Review of Medical	• <a href="https://www.ken">https://www.ken</a>
	system	- C1	Á	MCO	Physiology.25TH Edition.	hub.com/en/libra
Introduction to autonomic	Enumerate the functions of autonomic nervous	C1	I CIG	MCQ	(Chapter 13, Page 255,259)	ry/anatomy/auto
nervous system Basic Characteristics of	system  Describe symmethatic and paragrammathatic negrous	C1	LGIS	SEQ VIVA	<ul> <li>Physiology by Linda S.</li> <li>Costanzo 6th Edition.</li> </ul>	nomic-nervous-
sympathetic &	Describe sympathetic and parasympathetic nervous system	CI		VIVA	Autonomic Nervous	<u>system</u> https://youtu.be/j9p
parasympathetic function	• Enumerate & explain their receptors,	C1	1		System(Chapter 02. Page	UItHAAhs
	neurotransmitters & physiological effects				47,59)	https://youtu
	Describe physiological anatomy & effects of adrenal medulla	C1			Human Physiology by Dee Unglaub Silver thorn. 8TH	.be/7pGKa-1tSJw

Somatosensory cortex & lesions of somatosensory cortex	<ul> <li>Explain cortical mapping &amp; association cortex</li> <li>Describe lesions of somatosensory areas</li> <li>Summarize role of thalamus in somatic sensations</li> <li>Interpret the importance of dermatomes</li> </ul>	C2 C1 C1 C3	LGIS	MCQ SEQ VIVA	Edition.The Central Nervous System (Chapter 11 Page 392) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 61, Page 763,765) • Textbook of Medical Physiology by Guyton & Hall.14th Edition.(Chapter 48,Page 603) https://nba.uth.tmc.edu/neurosci ence/m/s2/chapter04.html	https://youtu.be/gB OAYgMxq-Q  https://teachmeanat omy.info/neuroanat omy/pathways/asce nding-tracts- sensory/
Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation	Briefly explain physiological actions of ANS, vasomotor tone, vagal tone & sympathetic stress response     Draw a table showing autonomic effects on various body organs     Briefly describe the pharmacology of autonomic nervous system	C2 C1 C1	LGIS	MCQ SEQ VIVA	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. (Chapter 13, Page 264)</li> <li>Physiology by Linda S. Costanzo 6th Edition. Autonomic Nervous</li> <li>System(Chapter 02. Page 55)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 11 Page 397)  Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 09.(Chapter 61, Page 768)</li> </ul>	• https://youtu.be/ 7pGKa-1tSJw • https://www.ken hub.com/en/libra ry/anatomy/auto nomic-nervous- system https://www.diffen. com/difference/Par asympathetic_nervo us_system_vs_Sym pathetic_nervous_s ystem
CSF, Blood Brain Barrier, Blood CSF Barrier, Lumber Puncture	<ul> <li>Describe briefly the physiological anatomy of cerebral blood flow</li> <li>Explain cerebrospinal fluid system</li> <li>Describe the CSF pressure, its measurement by lumbar puncture, &amp; hydrocephalus</li> <li>Explain blood CSF barrier &amp; BBB</li> </ul>	C1 C2 C1	LGIS	MCQ SEQ VIVA	Physiology by Linda S.     Costanzo 6th Edition.     Neurophysiology (Chapter 03. Page 113)         Textbook of Medical Physiology by Guyton &	• https://youtu.be/f 9xi1Rf5m9w https://www.scienc edirect.com/topics/ neuroscience/blood -cerebrospinal- fluid-barrier

	Describe brain edema	C1			Hall.14th Edition. Section 09.(Chapter 62, Page 777-784)	
	Draw association areas of brain	C1			, , , , , ,	https://my.clevelan
Concept of Association	Describe association areas of brain regarding their physiological role	C1		MCQ	Textbook of Medical     Physiology by Guyton &	dclinic.org/health/a rticles/23073-
areas, dominant and non- dominant cerebral	Explain briefly the clinical features, if the association areas become damaged	C2	LGIS	SEQ VIVA	Hall.14th Edition. Section 09.(Chapter 58, Page	cerebral-cortex https://youtu.be/2Z
hemispheres	Describe concept of dominant hemisphere	C1			727)	425-CHY1c
	Enlist role of parieto-occipito temporal cortex in non-dominant hemisphere	C1				
	Describe the concept of limbic system	C1			Textbook of Medical	• https://youtu.be/
	Describe physiological anatomy of limbic system	C1			Physiology by Guyton &	h3K9RfGw8sI
Limbic system	Enumerate and explain the roles of hippocampus, amygdala and limbic cortex	C1		MCQ	Hall.14th Edition	https://www.endocr ineweb.com/endocr
Functions of hypothalamus	Describe physiological anatomy of hypothalamus	C1	LGIS	SEQ		inology/overview-
	Enlist functions of hypothalamus	C1		VIVA		hypothalamus
	<ul> <li>Explain role of hypothalamus in:</li> <li>Vegetative function</li> <li>Endocrine function Behavioral function</li> <li>Reward and punishment function</li> </ul>	C2				
	Describe sensory and motor aspects of communication	<b>C</b> 1		MCQ	• Ganong's Review of Medical Physiology.25TH Edition.	• https://www.scie ncedirect.com/sc
Speech and aphasia	Define Wernicke's aphasia, Motor aphasia & Global aphasia	C1	LGIS	SEQ VIVA	(Chapter 15, Page 290,293) Physiological Basis of Medical	ience/article/abs/ pii/S0021992422
	Explain Wernicke's aphasia, Motor aphasia & Global aphasia	C2			Practice by Best & Taylor's 13th Edition. (Chapter	000892 https://www.stroke.
	Describe function of corpus callosum & anterior commissure in transferring information between two cerebral hemispheres	C1			70, Page 1211)	org.uk/what-is- aphasia/types-of- aphasia
	Define memory & classify its various types	C1			Ganong's Review of Medical	• https://youtu.be/
Learning and memory	Describe role of synaptic inhibition and synaptic facilitation in memory	C1	LGIS	MCQ SEQ	Physiology.25TH Edition. Section 02 (Chapter 15, Page	EqdsQDM5Fys https://www.scienc
	Explain mechanism of short term, intermediate and long-term memory	C2		VIVA	<ul><li>283)</li><li>Physiology by Linda S.</li></ul>	edirect.com/topics/ psychology/learnin
	Describe mechanism of consolidation of memory	C1			Costanzo 6th	g-and-memory
	Enumerate specific parts of brain involved in	C2			Edition.(Chapter 03. Page	

	memory				112)	
	Explain the role of each part	C2			Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 09 Page 332)     Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section	
	Describe activating driving system of the brain	C1			<ul><li>09.(Chapter 58, Page 735)</li><li>Ganong's Review of Medical</li></ul>	• https://youtu.be/
	Explain the reticular activating system	C2	_		Physiology.25TH Edition.	TdGQvWAZ0Cs
Reticular activating system	Discuss the control of cerebral activity by signals from brain stem	C2	LGIS	MCQ SEQ	Section 02 (Chapter 14, Page 269,272,278)	https://www.physio
and sleep	Explain neurohormonal system of the brain	C2		VIVA	Human Physiology by Dee	pedia.com/Reticula
	Define sleep and enumerate types of sleep	C1			Unglaub Silver thorn. 8TH	r Formation
	Compare and contrast between two types of sleep	C2			Edition.Sensory Physiology	
	Describe the basic theories of sleep in detail	C1			(Chapter 10 Page 344)	
	Explain physiological effects of sleep	C2			<ul> <li>Physiological Basis of</li> </ul>	
	Describe sleep and wakefulness cycle	C1			Medical Practice by Best & Taylor's.13th Edition. (Chapter 70, Page 12031208) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 60, Page 753)	
	Describe brain waves	C1			Ganong's Review of Medical	https://www.webm
	Enumerate different types of brain wave	C2	]		Physiology.25TH Edition.	d.com/epilepsy/gui
	Explain the origin of different brain waves	C2			Section 02 (Chapter 14, Page	de/types-epilepsy
	Describe EEG	C1			275)	https://youtu.be/T7
FEC. 1 11	Define epilepsy	C1	]	MCC	Physiology by Linda S.	MKlPYiL48
EEG and epilepsy	Enumerate various types of epilepsy	C1	LOIG	MCQ	Costanzo 6th	
	Explain various types of epilepsy	C2	LGIS	SEQ	Edition.(Chapter 03. Page	
	Describe role of nor-epinephrine, serotonin and	C1		VIVA	42)	
	dopamine in psychotic disorders	C1			Physiological Basis of Medical Practice by Best &	
	Describe the causes, symptoms & treatment of depression & bipolar disorder	C1			Taylor's.13th Edition.	

Introduction to motor nervous system & Reflex action Conditioned reflexes & properties Properties of reflex action Control of spinal cord reflexes by higher centers	<ul> <li>Discuss causes, types, symptoms and treatment of schizophrenia</li> <li>Define Alzheimer's disease. Mention its causes, clinical features, incidence and treatment</li> <li>Outline brief introduction of motor nervous system</li> <li>Give concept of cortical &amp; subcortical motor control</li> <li>Briefly explain UMN, LMN, anterior motor neurons &amp; interneurons</li> <li>Define reflex action</li> <li>Define and draw reflex arc</li> <li>Enumerate components of reflex arc</li> <li>Classify the reflexes</li> <li>Define conditioned reflex</li> <li>Enlist and describe properties of conditioned reflexes</li> <li>Give examples of conditioned reflex</li> <li>Enlist and Explain properties of reflex action</li> <li>Compare &amp; contrast spinal animal with decerebrate animal</li> <li>Describe organization of spinal cord for motor functions</li> <li>Explain the concept of cortical &amp; subcortical control.</li> <li>Define UMN &amp; LMN</li> </ul>	C2 C1 C1 C1 C2 C1 C1 C2 C1 C1 C2 C1 C1 C2 C1 C1 C1 C1 C2 C1 C1 C2 C2 C1 C1 C2 C2	LGIS	MCQ SEQ VIVA	(Chapter 70, Page 1209) Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 60, Page 756)  • Ganong's Review of MedicalPhysiology.25TH Edition. Section 02  • (Chapter 12, Page 237,240)  • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 110)  • Textbook of Medical Physiology by Guyton & Hall.14th Edition.  • Section 09.(Chapter 56, Page 697)	https://www.physio - pedia.com/Extrapyr amidal_and_Pyrami dal_Tracts https://youtu.be/B8 8BNYWVkWE
Introduction to cerebellum Neuronal circuits of cerebellum Cerebellum and its motor functions	<ul> <li>Describe physiological anatomy of cerebellum</li> <li>Classify the functional parts of cerebellum &amp; mention their functions</li> <li>Describe neuronal circuits of cerebellum in detail</li> <li>Enumerate the afferent and efferent pathways</li> <li>Describe the functional unit of cerebellar cortex &amp; deep cerebellar nuclei</li> <li>Explain the role of purkinje cell, Deep nuclear cells and inhibitory cells of cerebellum in overall functions of cerebellum</li> </ul>	C1 C2 C1 C1 C1	LGIS	MCQ SEQ VIVA		

	Explain role of climbing fibers	C2				
	Discuss the turn-on and turn-off mechanism	C2				
	Enlist and explain motor functions of cerebellum	C1				
	Explain the role of vestibulo cerebellum, spino cerebellum & neocerebellum in overall motor control by cerebellum	C2				
	Describe muscle spindle & Golgi tendon organ in detail	C1			Ganong's Review of Medical Physiology.25TH Edition.	https://www.osmosi s.org/learn/Muscle_
Muscle spindle & Golgi	• Explain the receptor function of the Muscle Spindle & Golgi tendon organ	C2			Section 02 (Chapter 12, Page 229,234)	spindles_and_golgi _tendon_organs
tendon organ Role of muscle	<ul> <li>Draw muscle spindle and Golgi tendon organ showing the sensory and motor innervation</li> </ul>	C1	LGIS	MCQ SEQ	Physiological Basis of Medical Practice by Best &	https://youtu.be/Cz eAcc39Cyo
spindle and Golgi tendon organ in voluntary	<ul> <li>Explain the dynamic and static response of muscle spindle &amp; Golgi tendon organ</li> </ul>	C2		VIVA	Taylor's.13th Edition. (Chapter 68, Page 476)	
motor activity	Briefly describe muscle stretch reflex	C1			Textbook of Medical	
	• Draw the neuronal circuitry of the stretch reflex	C1			Physiology by Guyton &	
	<ul> <li>Explain the static and dynamic components of stretch reflex</li> </ul>	C2			Hall.14th Edition. Section 09.(Chapter 55, Page 686,691)	
	Discuss the clinical applications of stretch reflex	C2				
	Explain negative stretch reflex	C2				
	Explain lengthening reaction and its significance	C2				
	Describe role of muscle spindle and Golgi	C1				
	tendon organ in voluntary muscle activity					
	• Explain the role of alpha gamma co activation	C2				
Manifestations of cerebellar disease	Enlist and explain clinical abnormalities of cerebellum	C2	LGIS	MCQ SEQ VIVA		
	<ul> <li>Enlist polysynaptic reflexes</li> </ul>	C1				
	<ul> <li>Describe the polysynaptic reflexes</li> </ul>	C1				
Polysynaptic reflexes Transection of spinal cord	• Explain mechanism of reciprocal inhibition and reciprocal innervation	C2				
Role of brain stem in controlling motor functions	Enlist and describe reflexes of posture and locomotion	C1				
Lesions of motor system	Explain scratch reflex	C2	]	MCQ		
	• Enumerate the spinal cord reflexes that cause muscle spasm	C1	LGIS	SEQ VIVA		
	Enlist autonomic reflexes in the spinal cord	C1				

	D' (1 1 1 1	<u> </u>				
	Briefly describe transection of spinal cord	C1				
	• Explain stages of complete transection	C2				
	Briefly explain stages of complications in complete transection of spinal cord	C2				
	Describe hemi section of spinal cord	C1				
	Explain brown-sequard syndrome	C1	1			
	Enumerate and explain role of brainstem in	C1,C2				
	controlling motor function		-			
	• Explain role of pontine & medullary reticular nuclei	C2				
	Briefly write role of vestibular nuclei in antigravity muscle control	C1				
	Summarize decerebrate rigidity	C1				
	Enlist the effects of damage to specialized areas of motor cortex	C1				
	Differentiate UMN Lesion and LMN Lesion	C2	-			
	Explain decorticate rigidity	C2	-			
	Briefly explain the pathophysiology of	C2	-			
	syringomyelia, tabs- dorsalis & poliomyelitis	CZ				
	Briefly describe motor areas in cortex	C1	LGIS	MCQ	Ganong's Review of Medical	• https://youtu.be/
Motor cortex & physiological importance	Brieffy describe motor areas in cortex	CI	LOIS	SEQ VIVA	Physiology.25TH Edition. Section 02 (Chapter 12, Page	hxvep2Y8ShI https://www.scienc
of neocortex Corticospinal or pyramidal	Draw motor & somatic association areas of motor	C1			<ul><li>243)</li><li>Physiology by Linda S.</li></ul>	edirect.com/science
	cortex	01				/article/pii/S221475
tract	Explain functions of motor & somatic association	C2			Costanzo 6th Edition.(Chapter 03. Page	192300026 https://teachmeanat
	Explain functions of motor & somatic association areas	C2			Costanzo 6th	1923000026 https://teachmeanat
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> </ul>	C2 C2			Costanzo 6th Edition.(Chapter 03. Page	1923000026
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> </ul>	C2 C2 C1			Costanzo 6th Edition.(Chapter 03. Page 110)	1923000026 https://teachmeanat omy.info/neuroanat
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> <li>Explain transmission of signals from motor cortex to</li> </ul>	C2 C2	I GIG	NGO	Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of	192300026 https://teachmeanat omy.info/neuroanat omy/structures/basa
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> <li>Explain transmission of signals from motor cortex to muscle</li> </ul>	C2 C2 C1 C2	LGIS	MCQ	Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best &	192300026 https://teachmeanat omy.info/neuroanat omy/structures/basa
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> <li>Explain transmission of signals from motor cortex to muscle</li> <li>Draw course of pyramidal tract</li> </ul>	C2 C2 C1 C2	LGIS	SEQ	Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition.	192300026 https://teachmeanat omy.info/neuroanat omy/structures/basa
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> <li>Explain transmission of signals from motor cortex to muscle</li> <li>Draw course of pyramidal tract</li> <li>Enlist the functions of pyramidal tract</li> </ul>	C2 C2 C1 C2 C1 C1	LGIS	-	Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 69, Page 1194)	192300026 https://teachmeanat omy.info/neuroanat omy/structures/basa
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> <li>Explain transmission of signals from motor cortex to muscle</li> <li>Draw course of pyramidal tract</li> <li>Enlist the functions of pyramidal tract</li> <li>Mention the effects of lesions in Corticospinal tract</li> </ul>	C2 C1 C2 C1 C1 C1 C1	LGIS	SEQ	Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 69, Page 1194) • Textbook of Medical	192300026 https://teachmeanat omy.info/neuroanat omy/structures/basa
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> <li>Explain transmission of signals from motor cortex to muscle</li> <li>Draw course of pyramidal tract</li> <li>Enlist the functions of pyramidal tract</li> <li>Mention the effects of lesions in Corticospinal tract</li> <li>Briefly describe extra pyramidal descending tracts</li> </ul>	C2 C1 C1 C1 C1 C1	LGIS	SEQ	Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 69, Page 1194) • Textbook of Medical Physiology by Guyton &	192300026 https://teachmeanat omy.info/neuroanat omy/structures/basa
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> <li>Explain transmission of signals from motor cortex to muscle</li> <li>Draw course of pyramidal tract</li> <li>Enlist the functions of pyramidal tract</li> <li>Mention the effects of lesions in Corticospinal tract</li> <li>Briefly describe extra pyramidal descending tracts</li> <li>Describe rigidity and spasticity</li> </ul>	C2 C1 C2 C1 C1 C1 C1 C1 C1	LGIS	SEQ	Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 69, Page 1194) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section	192300026 https://teachmeanat omy.info/neuroanat omy/structures/basa
tract	<ul> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> <li>Explain transmission of signals from motor cortex to muscle</li> <li>Draw course of pyramidal tract</li> <li>Enlist the functions of pyramidal tract</li> <li>Mention the effects of lesions in Corticospinal tract</li> <li>Briefly describe extra pyramidal descending tracts</li> </ul>	C2 C1 C1 C1 C1 C1	LGIS	SEQ	Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 69, Page 1194) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section	192300026 https://teachmeanat omy.info/neuroanat omy/structures/basa

	Draw neuronal circuits of basal ganglia	C1	
Basal Ganglia & Lesions	Explain the role of neuronal circuits in	C2	
	functioning of basal ganglia		
	Enlist and explain the physiological role of	C1	
	neurotransmitters in basal ganglia system		
	Enumerate the clinical abnormalities caused by	C1	
	damage to basal ganglia		
	Briefly explain Parkinson disease regarding its	C2	
	causes, signs and symptoms & treatment		
	Explain Huntington's Chorea regarding its	C2	
	causes, signs and symptoms		

## **Biochemistry Large Group Interactive Session (LGIS)**

Topic	At The End Of Lecture Students Should Be Able To	C/P/A	Teaching	Assessment
			Strategy	Tool
	<ul> <li>Describe synthesis &amp; breakdown of TAGs and factors affecting it</li> </ul>	C2		MCQs
Triglyceride			LGIS	SAQs
Metabolism, Fatty acid transport	• Explain entry of fatty acid into mitochondria (carnitine shuttle)	C2		Viva
	• Describe steps, enzymes, energy calculations of β- oxidation of saturated	C2		MCQs
Oxidation of fatty acid	fatty acid (Odd + Even)		LGIS	SAQs
				Viva
	<ul> <li>Discuss other types of oxidations and related disorders</li> </ul>	C2		MCQs
Oxidation of fatty acid			LGIS	SAQs
				Viva
	• Explain the steps, regulation and related diseases of fatty acid synthesis	C2		MCQs
Fatty acid synthesis			LGIS	SAQs
				Viva
	• Describe the steps, regulation and related disorders of Cholesterol	C2		MCQs
Cholesterol Synthesis	Synthesis		LGIS	SAQs
				Viva
Plasma Cholesterol	Recall normal Plasma Cholesterol level and factors controlling it	C1		MCQs
level			LGIS	SAQs
				Viva

	• Explain the synthesis and breakdown of Ketone bodies with related diseases	C2		MCQs
Ketone bodies	(ketoacidosis)		LGIS	SAQs
metabolism				Viva
Metabolism of	Describe the steps of biosynthesis of Glycerophospholipids with its	C2		MCQs
Glycerophospholipid	regulation and clinical significance		LGIS	SAQs
				Viva
Metabolism of	• Explain the steps of biosynthesis of sphingophospholipids with its regulation	C2		MCQs
Sphingophospholipids	and clinical significance		LGIS	SAQs
				Viva
	Discuss the functions and roll of Lipoproteins & apolipoprotein	C2		MCQs
Introduction to			LGIS	SAQs
Lipoproteins				Viva

	• Explain the composition, functions and clinical significance of LDL& HDL	C2		MCQs
LDL& HDL	Illustrate the mechanism of reverse cholesterol transport	C3	LGIS	SAQs
	-			Viva
Disorders of	Classify and explain the disorders of lipoprotein metabolism.	C2		MCQs
lipoprotein metabolism	• (hyper & hypo lipoproteinemia)		LGIS	SAQs
				Viva
	Interpret conditions leading to Fatty liver	C3		MCQs
Fatty Liver & Adipose	Describe metabolism of adipose tissue & Brown fat	C2	LGIS	SAQs
Tissue				Viva
	Classify and explain the disorders of lipoprotein metabolism.	C2		MCQs
Disorders of	• (hyper & hypo lipoproteinemia)		LGIS	SAQs
lipoprotein metabolism				Viva

## **Anatomy Small Group Discussion (SGDs)**

Topic	At The End Of Lecture Students Should Be Able To	C/P/A	Teaching	Assessment
	71 11 1	C2	Strategy	Tool
	Identify and describe the boundaries of anterior and middle cranial fossae			• MCO
Anterior & Middle cranial fossae	Discuss anatomical features present in anterior and middle cranial fossa	C2		• MCQs
	Locate foramina and describe the structures passing through them	C2	Skills lab	• SAQs
	Correlate with the clinical conditions & cross sections.	C3	Skiiis iao	• SEQ
Cramar 1005ac	Understand curative and preventive health care measures.	C3		• OSPE
	Practice the principles of bioethics.	C3		VIVA
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	• Identify and describe the boundaries of posterior cranial fossa	C2		
	Discuss anatomical features present in posterior cranial fossa	C2	Skills lab	<ul><li>MCQs</li><li>SAQs</li><li>SEQ</li><li>OSPE</li></ul>
	• Locate foramina and describe the structures passing through them	C2		
D / 1 1.0	• Correlate with the clinical conditions & cross sections.	C3		
Posterior cranial fossa	• Understand curative and preventive health care measures.	C3		
	• Practice the principles of bioethics.	C3		
	• Apply strategic use of A.I in health care.	C3		VIVA
	Read relevant research article.	C3		
	• Identify and describe meninges and their reflections on specimens and models	C2		
	Describe the attachments and relations of dural venous sinuses of brain with	C2		
Meninges, Dural	the help of models and specimens			• MCQs
venous sinuses, and	• Discuss the clinical importance of facial vein connection with dural venous	C3	Skills lab	• SAQs
intracranial	sinuses.			• SEQ
hemorrhages	• Differentiate between various types of intracranial hemorrhages	C3		• OSPE
	• Correlate with the clinical conditions & cross sections.	C3		VIVA
	• Understand curative and preventive health care measures.	C3		VIVA
	• Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		

	Differentiate between different types of headaches	C3		
	Describe the internal and external structure of spinal cord	C2		
Spinal cord	Compare the arrangement of white and gray matter in different regions of the spinal cord	C2		
	Enumerate the major ascending and descending tracts of spinal cords	C1	]	
	Illustrate the arrangements of ascending and descending tracts in the spinal cors	C2	Skills lab	<ul><li>MCQs</li><li>SAQs</li></ul>
	Correlate with the clinical conditions & cross sections.	C3		• SEQ
	Understand curative and preventive health care measures.	C3		• OSPE
	Practice the principles of bioethics.	C3		VIVA
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	List the ascending tracts of the spinal cord	C1		
	Tabulate the sensation, receptor, first to third order neurons, pathways and destinations	C2	-	
Ascending tracts and	Describe and illustrate the pathways of lateral spinothalamic tract, anterior spinothalamic tract, anterior spinocelebellar tract and posterior spinocerebellar tracts	C2	Skills lab	• MCQs • SAQs
their clinicals	Describe and illustrate the pathways of spinotectal tract, spinoreticular tract and spino-olivary tracts	C2		• SEQ • OSPE
	Describe the anatomical basis of the signs and symptoms in lesions of the ascending tracts	C3	-	VIVA
	Correlate with the clinical conditions & cross sections.	C3		
	Understand curative and preventive health care measures.	C3		
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	List the descending tracts of the spinal cord	C1		• MCQs
	Tabulate the sensation, receptor, first to third order neurons, pathways and	C2		• SAQs
Descending tracts and	destinations of pyramidal and extrapyramidal tracts		C1-:11- 1-1-	• SEQ
their clinicals	Describe and illustrate the pathways of corticospinal tracts	C2	Skills lab	• OSPE
	Describe and illustrate the pathways of extrapyramidal tracts	C2	_	VIVA
	Describe the anatomical basis of the signs and symptoms in lesions of upper and lower motor neuron lesions	C3		

	Correlate with the clinical conditions & cross sections.	C3		
	Understand curative and preventive health care measures.	C3		
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Explain anatomical basis of signs and symptoms of anterior and posterior nerve root lesions	C3		
Lesions of Spinal	<ul> <li>Explain anatomical basis of signs and symptoms of complete cord transection syndrome, central cord syndrome, syringomyelia, anterior cord syndrome, Brown-Sequard Syndrome, Poliomyelitis and amyotrophic lateral sclerosis</li> </ul>	С3	Skills lab	• MCQs • SAQs
Cord	Correlate with the clinical conditions & cross sections.	C3		• SEQ
	Understand curative and preventive health care measures.	C3		• OSPE
	Practice the principles of bioethics.	C3		VIVA
	Apply strategic use of A.I in health care.	C3		VIVA
	Read relevant research article.	C3		
	Identify and describe gross features of medulla and identify them on gross specimen/model.	C2		
	• Identify and describe internal structure of medulla on cross sectional diagrams.	C2		• MCQs
Medulla oblongata	Describe the anatomical basis and clinical features of raised pressure in posterior cranial fossa, Arnold Chiari malformation, lateral and medial medullary syndrome.	C2	Skills lab	• SAQs • SEQ
	Correlate with the clinical conditions & cross sections.	C3		• OSPE
	Understand curative and preventive health care measures.	C3		VIVA
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	<ul> <li>Identify and describe the gross features of Pons on a given specimen/model</li> </ul>	C2		• MCQs
Pons & the	<ul> <li>Identify and describe internal structure of pons on cross sectional diagrams.</li> </ul>	C2	1	• SAQs
Fourth ventricle	<ul> <li>Describe the boundaries and relations of 4th ventricle</li> </ul>	C2	1	_
	Describe the anatomical basis of clinical features of tumors, hemorrhage and	C3	Skills lab	• SEQ
	infarctions of pons	C3		• OSPE
	Correlate with the clinical conditions & cross sections.	C3	1	VIVA
	<ul> <li>Understand curative and preventive health care measures.</li> </ul>	C3	1	
	•		4	
	• Practice the principles of bioethics.	C3	1	

	Read relevant research article.	C3		
	• Identify and describe the gross features of Pons on a given specimen/model	C2		
	• Identify and describe internal structure of pons on cross sectional diagrams.	C2		
	Describe the boundaries and relations of 4th ventricle	C2		• MCQs
	Describe the anatomical basis of trauma, cerebral aqueduct stenosis and	C3	]	• SAQs
Midbrain & Cerebral aqueduct	vascular lesions of midbrain.		Skills lab	• SEQ
	• Correlate with the clinical conditions & cross sections.	C3		• OSPE
	Understand curative and preventive health care measures.	C3		VIVA
	Practice the principles of bioethics.	C3		*****
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Identify and describe the gross features of cerebellum	C1		
	Describe internal structure of gray and white matter of cerebellar cortex	C2		
	Describe the cerebellar cortical mechanisms	C1		
	Describe afferent and efferent fibers of cerebellum	C2		
	Discuss the functions of cerebellum	C2		
C111	Describe the anatomical basis of signs and symptoms of cerebellar diseases	C3	Skills lab	<ul><li>MCQs</li><li>SAQs</li></ul>
Cerebellum	such as hypotonia, gait alteration, ataxia, dysdiadochokinesia, disturbances in			
	reflexes, disturbances in ocular movement, disorders of speech			• SEQ
	• Describe the anatomical basis of signs and symptoms of cerebellar syndromes	C3		• OSPE
	such as vermis syndrome and cerebellar hemisphere syndrome			VIVA
	• Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	• Identify and describe the gross structure of thalamus, epithalamus and	C2		• MCQs
Thalamus,	subthalamus			• SAQs
Epithalamus &	• Enlist nuclei of thalamus, epithalamus & subthalamus and describe their	C1	Skills lab	• SEQ
Subthalamus	functions			• OSPE
	• Describe the anatomical basis for the lesions of thalamus, epithalamus and	C3		
	subthalamus such as thalamic pain and thalamic hand		_	• VIVA
	• Correlate with the clinical conditions & cross sections.	C3	1	
	Understand curative and preventive health care measures.	C3	1	
	Practice the principles of bioethics.	C3		

	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Enlist nuclei of thalamus, epithalamus & subthalamus and describe their functions	C1		
	Identify and describe the functions of tuber cinereum and mamillary bodies	C2		• MCQs
Hypothalamus and 3 <sup>rd</sup>	Describe the various afferent and efferent connections of hypothalamic nuclei	C2		• SAQs
Hypothalamus and 3 <sup>rd</sup> Ventricle	Describe the anatomical basis for the lesions of hypothalamus and hypothalamic syndromes	C3	Skills lab	• SEQ
	Describe the boundaries and relations of the 3rd ventricle	C2		• OSPE
	Correlate with the clinical conditions & cross sections.	C3		• VIVA
	Understand curative and preventive health care measures.	C3		
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Identify and describe the gross features of cerebrum	C2		
	Identify the describe the lobes and subdivisions of cerebrum	C2		
	Identify the sulci and gyri of cerebral cortex and describe their functions	C2		
Cortical areas, Layers	Identify and describe the commissural, association and projection fibers present in the white matter of the brain.	C2	Skills lab	<ul><li>MCQs</li><li>SAQs</li></ul>
and Lesions of Cerebrum	Discuss the anatomical basis of lesions of internal capsule and alzheimer's disease	С3		• SEQ • OSPE
	Discuss the anatomical basis of cerebral cortical lesions of the motor cortex, frontal eye field, motor & sensory speech areas, prefrontal cortex, sensory cortex and visual areas	СЗ		• VIVA
	Discuss the anatomical basis of schizophrenia and frontal lobectomy	C3		
	Discuss the basis cerebral dominance, consciousness, persistent vegetative state, sleep and epilepsy.	С3		
	Correlate with the clinical conditions & cross sections.	C3	-	
	Understand curative and preventive health care measures.	C3	-	
	Practice the principles of bioethics.	C3	1	
	Apply strategic use of A.I in health care.	C3	1	
	Read relevant research article.	C3	1	
	Describe the relations and boundaries of lateral ventricle	C2		
	Describe the formation of choroid plexus in ventricles	C2		

	- Familia de Caratina and familia de Caratina de Carat	C2		
	• Explain the function, production, circulation, and absorption of cerebrospinal fluid	C2		
Lateral Ventricle	Explain the causes of overproduction and blockage of CSF	C2		
&CSF	• Discuss the anatomical basis of various types of hydrocephalus and papilledema.	C3	Skills lab	
	<ul> <li>Discuss the formation and clinical significance of blood brain barrier, blood CSF barrier and CSF Brain interface.</li> </ul>	C3		<ul><li>MCQs</li><li>SAQs</li></ul>
	• Correlate with the clinical conditions & cross sections.	C3		• SEQ
	Understand curative and preventive health care measures.	C3		• OSPE
	Practice the principles of bioethics.	C3	-	• VIVA
	• Apply strategic use of A.I in health care.	C3	-	· VIVI
	Read relevant research article.	C3	-	
	Identify the nuclei and connections of CN I,II,II,IV,VI	C2		
	Trace the pathway and perform reflexes associated with of CN I,II,II,IV,VI	C2	-	
Cranial nerves	Describe the anatomical basis of lesions of visual pathway and	C3	Skills lab	• MCQs
	ophthalmoplegias			• SAQs
I,II,II,IV,VI	Correlate with the clinical conditions & cross sections.	C3		• SEQ
	Understand curative and preventive health care measures.	C3		• OSPE • VIVA
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		· VIVI
	Read relevant research article.	C3	1	
	Identify the nuclei and connections of CN V,VII	C2		• MCQs
Cranial nerves	Trace the pathway and perform reflexes associated with of CN V,VII	C2	1	
V,VII	Describe the anatomical basis of upper and lower motor neuron lesion of CN     V and trigeminal neuralgia	C3	Skills lab	• SAQs • SEQ
	• Correlate with the clinical conditions & cross sections.	C3		• OSPE
	Understand curative and preventive health care measures.	C3	1	
	Practice the principles of bioethics.	C3	=	• VIVA
	Apply strategic use of A.I in health care.	C3	=	
	Read relevant research article.	C3	=	
Cranial nerves	Identify the nuclei and connections of CN VIII-XII	C2		
VIII-XII	Trace the pathway and perform reflexes associated with of CN VIII-XII	C2	]	
	Discuss the anatomical basis of vertigo, nystagmus, deafness, tinnitus, taste and gag reflex	C3	Skills lab	• MCQs

	Discuss the anatomical basis of paralysis of muscles supplied by accessory and hypoglossal nerves	C3		• SAQs • SEQ
	Correlate with the clinical conditions & cross sections.	C3		• OSPE
	Understand curative and preventive health care measures.	C3		
	Practice the principles of bioethics.	C3		• VIVA
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Enlist components of basal ganglia	C1		
	Discuss functions of basal ganglia	C2		
	Describe the connections of basal ganglia	C2		
Basal ganglia	Discuss the anatomical basis of hypo and hyperkinetic disorders such as chorea, hemiballismus, Parkinson's disease and athetosis.	C3	Skills lab	<ul><li>MCQs</li><li>SAQs</li></ul>
	Correlate with the clinical conditions & cross sections.	C3		• SEQ
	Understand curative and preventive health care measures.	C3		• OSPE
	Practice the principles of bioethics.	C3		VIVA
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Enlist components and connections of limbic system	C1		
	Discuss functions of limbic system	C2		• MCQs
Limbic system &	Describe the connections of limbic system	C2	Skills lab	• SAQs
Reticular formation	Enlist components of reticular system	C1		• SEQ
	Discuss functions of reticular system	C2		• OSPE
	Describe the connections of reticular system	C1		• VIVA
	• Discuss the anatomical basis of loss of consciousness, schizophrenia, Kluver-Bucy syndrome and temporal lobe dysfunction	C3		V I V I I
	Correlate with the clinical conditions & cross sections.	C3		
	Understand curative and preventive health care measures.	C3		
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Describe the arterial supply of brain and spinal cord from internal carotid artery and vertebrobasilar systems	C2		• MCQs
	Describe the circle of Willis along with its clinical significance	C2		• SAQs
	Describe the venous drainage of brain and spinal cord	C2	Skills lab	

Blood Supply of Brain and clinicals	<ul> <li>Discuss the anatomical basis of signs and symptoms of cerebral vessel occlusions and spinal cord ischemias.</li> <li>Correlate with the clinical conditions &amp; cross sections &amp; cross sections</li> <li>Understand curative and preventive health care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article.</li> </ul>	C3 C3 C3 C3 C3 C3 C3 C3		• SEQ • OSPE • VIVA
Radiological Imaging of CNS	<ul> <li>Identify and describe the appearance of different parts of brain in         <ul> <li>Normal radiographs</li> <li>MRI</li> <li>CT scan</li> </ul> </li> <li>Correlate with the clinical conditions &amp; cross sections.</li> <li>Understand curative and preventive health care measures.</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care.</li> <li>Read relevant research article.</li> </ul>	C2  C3  C3  C3  C3  C3  C3  C3	Skills lab	<ul><li>MCQs</li><li>SAQs</li><li>SEQ</li><li>OSPE</li><li>VIVA</li></ul>
Cross Sectional Anatomy	<ul> <li>Identify different structures of male pelvis at different levels; S5, coccyx, Symphysis pubis, ischial tuberosity, anal verge</li> <li>Identify different structures of female pelvis at different levels; S5, coccyx, Symphysis pubis, ischial tuberosity, anal verge</li> <li>Practice the principles of bioethics.</li> <li>Apply strategic use of A.I in health care</li> <li>Read a relevant research article</li> </ul>	C2 C2 C3 C3 C3 C3	Skill Lab	<ul><li>MCQs</li><li>SAQs</li><li>SEQ</li><li>OSPE</li><li>VIVA</li></ul>

## **Physiology Small Group Discussion (SGDs)**

Topic	At The End Of This LGIS, Second Year MBBS Students Should Be Able To:	Learning Objectives	Teaching Strategy	Assessment Tools
	Describe the general organization of nervous system	C1		
	• Describe major levels of CNS functions	C1	LGIS	MCQ
	Briefly explain nerve fiber structure, classification & properties	C2		SEQ
Synapse & Sensory	Describe labeled line principle	C1		VIVA
Receptors	• Define synapse	C1		
	• Enumerate & compare types of synapses	C2		
	Describe process of synaptic transmission	C1		

	Enumerate the important neurotransmitters of nervous system	C1		
	Enumerate & explain different types of sensory receptors according to	C1		
	function			
	• Enumerate & explain different types of sensory receptors according to location	C2		MCQ
	Enlist various properties of sensory receptors	C1	LGIS	SEQ
	Describe mechanism of signal transduction & generation of receptor potential	C1		VIVA
	Describe mechanism of adaptation of different types of receptors	C1		
	Describe the properties of sensory receptors	C1		
	Describe the types and characteristics of tactile receptors	C1		
	Briefly explain the electrical events during neuronal excitation and inhibition	C2	LGIS	MCQ
	Explain temporal and spatial summation	C1		SEQ
	Enlist & explain various characteristics of synaptic transmission	C1		VIVA
	Describe visceral pain and its causes	C1		
	Define headache	C1		
	Enlist the types of headache & their causes	C1		
	Explain the analgesia system	C2		
	Describe thermal receptors	C1	7	
	Explain mechanism of excitation of thermal receptors	C2		
	Describe transmission of thermal signals in nervous system	C1		
	Describe general organization of autonomic nervous system	C1		
Introduction to autonomic	Enumerate the functions of autonomic nervous system	C1		MCQ
nervous system	Describe sympathetic and parasympathetic nervous system	C1	LGIS	SEQ
Basic Characteristics of sympathetic &	• Enumerate & explain their receptors, neurotransmitters & physiological effects	C1		VIVA
parasympathetic function	Describe physiological anatomy & effects of adrenal medulla	C1		
	Briefly explain physiological actions of ANS, vasomotor tone, vagal tone & sympathetic stress response	C2		MCQ
	Draw a table showing autonomic effects on various body organs	C1	LGIS	SEQ
	Briefly describe the pharmacology of autonomic nervous system	C1		VIVA

	Outline brief introduction of motor nervous system	C1		
Introduction to motor	Give concept of cortical & subcortical motor control	C1		
nervous system & Reflex	Briefly explain UMN, LMN, anterior motor neurons &	C2		
action	interneurons			
Conditioned reflexes &	Define reflex action	C1		MCQ
properties	Define and draw reflex arc	C1	LGIS	SEQ
Properties of reflex action	Enumerate components of reflex arc	C1		VIVA
Control of spinal cord	Classify the reflexes	C2		
reflexes by higher centers	Define conditioned reflex	C1		
	Enlist and describe properties of conditioned reflexes	C1		
	Give examples of conditioned reflex	C1		
	Enlist and Explain properties of reflex action	C1,C2		
	Compare & contrast spinal animal with decerebrate animal	C2		
	Describe organization of spinal cord for motor functions	C1	-	
	Explain the concept of cortical & subcortical control.	C2		
	• Define UMN & LMN			
	Describe physiological anatomy of cerebellum	C1		
	Classify the functional parts of cerebellum & mention their functions	C2		
	Describe neuronal circuits of cerebellum in detail	C1		
	Enumerate the afferent and efferent pathways	C1		MCQ
Introduction to cerebellum Neuronal circuits of	Describe the functional unit of cerebellar cortex & deep cerebellar nuclei	C1	LGIS	SEQ VIVA
cerebellum Cerebellum and its motor	Explain the role of purkinje cell, Deep nuclear cells and inhibitory cells of cerebellum in overall functions of cerebellum	C2		
functions	Explain role of climbing fibers	C2		
	Discuss the turn-on and turn-off mechanism	C2		
	Enlist and explain motor functions of cerebellum	C1		
	Explain the role of vestibulo cerebellum, spino cerebellum &	C2		
	neocerebellum in overall motor control by cerebellum			
	Describe muscle spindle & Golgi tendon organ in detail	C1		
	Explain the receptor function of the Muscle Spindle & Golgi tendon	C2		
	organ		]	
	Draw muscle spindle and Golgi tendon organ showing the sensory	C1		
	and motor innervation			MCQ

Musala spindla & Calai	Explain the dynamic and static response of muscle spindle & Golgi tondon organ	C2	LGIS	SEQ VIVA
Muscle spindle & Golgi tendon organ	<ul><li>tendon organ</li><li>Briefly describe muscle stretch reflex</li></ul>	C1	-	VIVA
Role of muscle	Draw the neuronal circuitry of the stretch reflex	C1	-	
spindle and Golgi	Explain the static and dynamic components of stretch reflex	C2	-	
tendon organ in voluntary		C2	-	
motor activity	Discuss the clinical applications of stretch reflex  Explain a section stretch reflex	C2	-	
motor activity	Explain negative stretch reflex  Explain length pring reaction and its significance.		-	
	Explain lengthening reaction and its significance    Describe and of reveals arised to a declarity and containing the second containing to the second containing the second containing to the second containing the sec	C2	-	
	Describe role of muscle spindle and Golgi tendon organ in voluntary muscle activity	C1		
	Explain the role of alpha gamma co activation	C2	-	
		C2 C1		
	Enlist polysynaptic reflexes  Describe the relevant or reflexes.	C1	-	
	Describe the polysynaptic reflexes    Describe the polysynaptic reflexes   Descr		-	
	Explain mechanism of reciprocal inhibition and reciprocal innervation	C2		
	Enlist and describe reflexes of posture and locomotion	C1	-	
	Enlist and describe reflexes of posture and focomotion     Explain scratch reflex	C2	-	
		C2 C1	-	MCQ
	<ul> <li>Enumerate the spinal cord reflexes that cause muscle spasm</li> <li>Enlist autonomic reflexes in the spinal cord</li> </ul>	C1	LGIS	SEQ
	Briefly describe transection of spinal cord	C1	- 2010	VIVA
	Explain stages of complete transection	C2	-	, , , , , ,
	Briefly explain stages of complications in complete transection of spinal cord	C2		
	Describe hemi section of spinal cord	C1	-	
	Explain brown-sequard syndrome	C1	-	
	Explain brown-sequald syndrome     Enumerate and explain role of brainstem in controlling motor function	C1,C2	-	
	Explain role of pontine & medullary reticular nuclei	C1,C2	-	
	Briefly write role of vestibular nuclei in antigravity muscle control	C1	-	
	Summarize decerebrate rigidity	C1	-	
	Enlist the effects of damage to specialized areas of motor cortex	C1	-	
		C2	-	
	Differentiate UMN Lesion and LMN Lesion  Final in departments rigidity.		-	
	Explain decorticate rigidity      Driefly applein the pathon by inleast of agriculture and the decortic for the decorti	C2	-	
	Briefly explain the pathophysiology of syringomyelia, tabs- dorsalis & poliomyelitis	C2		
	Briefly describe motor areas in cortex	C1	LGIS	MCQ
	Draw motor & somatic association areas of motor cortex	C1	1	SEQ

Motor cortex &	Explain functions of motor & somatic association areas	C2		VIVA
physiological importance	Explain allocortex & neocortex	C2		
of neocortex	Describe medial and lateral descending pathways	C1		
Corticospinal or pyramidal	Explain transmission of signals from motor cortex to muscle	C2		
tract	Draw course of pyramidal tract	C1	LGIS	MCQ
Extra pyramidal system	Enlist the functions of pyramidal tract	C1		SEQ
	Mention the effects of lesions in Corticospinal tract	C1		VIVA
Basal Ganglia & Lesions	Briefly describe extra pyramidal descending tracts	C1		
	Describe rigidity and spasticity	C1		
	Describe location and function of red nucleus	C1		
	Describe physiological anatomy of basal ganglia	C1		
	Draw neuronal circuits of basal ganglia	C1		
	Explain the role of neuronal circuits in functioning of basal ganglia	C2		
	Enlist and explain the physiological role of neurotransmitters in basal ganglia system	C1		
	Enumerate the clinical abnormalities caused by damage to basal ganglia	C1		
	Briefly explain Parkinson disease regarding its causes, signs and symptoms & treatment	C2		
	Explain Huntington's Chorea regarding its causes, signs and symptoms	C2		
Limbic system	Describe the concept of limbic system	C1		
Functions of hypothalamus	Describe physiological anatomy of limbic system	C1		
••	Enumerate and explain the roles of hippocampus, amygdala and limbic cortex	C1		
	Describe physiological anatomy of hypothalamus	C1		
	• Enlist functions of hypothalamus	C1		
	Explain role of hypothalamus in:	C2		
	Vegetative function			
	<ul> <li>Endocrine function Behavioral function</li> </ul>			
	Reward and punishment function			

# **Biochemistry Small Group Discussion (SGDs)**

Topic	At The End Of Tutorial Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
Triglycerides & F.A. oxidation	• Explain the functions & uses of triglycerides and steps of oxidation of Fatty acids	C2	SGD	MCQs SAQs Viva
Fatty acid synthesis & cholesterol metabolism	• Describe the steps of fatty acid synthesis, cholesterol, their functions& clinical significance	C2	SGD	MCQs SAQs Viva
Ketone bodies & Phospholipids	<ul> <li>Describe the synthesis &amp; breakdown of ketone bodies and factors affecting them.</li> <li>Describe the phospholipids synthesis &amp; their functions</li> </ul>	C2 C2	SGD	MCQs SAQs Viva
Lipoprotein (HDL)	Explain HDL synthesis, its functions & clinical significance	C2	SGD	MCQs SAQs Viva
Lipoprotein (VLDL, LDL)	• Explain synthesis, functions & clinical significance of VLDL, LDL	C2	SGD	MCQs SAQs Viva

## **Anatomy Self-Directed Learning (SDL)**

Topics	Learning objectives	Learning Resources
Anterior And middle Cranial Fossa	<ul> <li>Identify and describe the boundaries of anterior and middle cranial fossae</li> <li>Discuss anatomical features present in anterior and middle cranial fossa</li> <li>Locate foramina and describe the structures passing through them</li> </ul>	<ul> <li>Clinically Oriented Anatomy, 9th Edition, pg no. 840-861</li> <li>https://www.youtube.com/watch?v=auogbJFitmI&amp;p p=ygUSY25zIGFuYXRvbXkgdmlkZW9z</li> <li>https://link.springer.com/article/10.1007/s00701-013-1937-0</li> </ul>
Posterior cranial fossa Dural venous sinuses and intracranial hemorrhages	<ul> <li>Identify and describe meninges and their reflections on specimens and models</li> <li>Describe the attachments and relations of dural venous sinuses of brain with the help of models and specimens</li> <li>Discuss the clinical importance of facial vein connection with dural venous sinuses.</li> <li>Differentiate between various types of intracranial hemorrhages</li> <li>Differentiate between different types of headaches</li> </ul>	<ul> <li>Clinically Oriented Anatomy, 9th Edition, pg no. 840-861, 884-885, 895</li> <li>https://www.youtube.com/watch?v=auogbJFitml&amp;pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z</li> <li>https://www.tandfonline.com/doi/abs/10.3109/02688699308995089</li> </ul>
Meninges & Spinal cord	<ul> <li>Describe the internal and external structure of spinal cord</li> <li>Compare the arrangement of white and gray matter in different regions of the spinal cord</li> <li>Enumerate the major ascending and descending tracts of spinal cords</li> <li>Illustrate the arrangements of ascending and descending tracts in the spinal cord</li> </ul>	<ul> <li>Clinically Oriented Anatomy, 9th Edition, pg no. 132-139, 883, 890-891</li> <li><a href="https://www.youtube.com/watch?v=auogbJFitmI&amp;pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z">https://www.youtube.com/watch?v=auogbJFitmI&amp;pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z</a></li> <li><a href="https://link.springer.com/chapter/10.1007/978-981-15-7771-0_3">https://link.springer.com/chapter/10.1007/978-981-15-7771-0_3</a></li> </ul>
Ascending tracts & Descending tracts	<ul> <li>List the ascending tracts of the spinal cord</li> <li>Tabulate the sensation, receptor, first to third order neurons, pathways and destinations</li> <li>Describe and illustrate the pathways of lateral spinothalamic tract, anterior spinothalamic tract, anterior spinocelebellar tract and posterior spinocerebellar tracts</li> </ul>	<ul> <li>Snell's Clinical Neuroanatomy 8th Edition, pg no. 131-182</li> <li><a href="https://www.youtube.com/watch?v=auogbJFitml&amp;p">https://www.youtube.com/watch?v=auogbJFitml&amp;p</a> p=ygUSY25zIGFuYXRvbXkgdmlkZW9z</li> <li><a href="https://link.springer.com/chapter/10.1007/978-1-4684-7688-0_7">https://link.springer.com/chapter/10.1007/978-1-4684-7688-0_7</a></li> </ul>

	<ul> <li>Describe and illustrate the pathways of spinotectal tract, spinoreticular tract and spino-olivary tracts</li> <li>Describe the anatomical basis of the signs and symptoms in lesions of the ascending tracts</li> </ul>	
Medulla Oblongata, Pons& Cerebellum	<ul> <li>Identify and describe gross features of medulla and identify them on gross specimen/model.</li> <li>Identify and describe internal structure of medulla on cross sectional diagrams.</li> <li>Identify and describe the gross features of Pons on a given specimen/model</li> <li>Identify and describe internal structure of pons on cross sectional diagrams.</li> <li>Identify and describe the gross features of cerebellum</li> <li>Describe internal structure of gray and white matter of cerebellar cortex</li> <li>Describe the cerebellar cortical mechanisms</li> </ul>	<ul> <li>Snell's Clinical Neuroanatomy 8th Edition, pg no. 185-247</li> <li>https://www.youtube.com/watch?v=auogbJFitmI&amp;pp=ygUSY25zIGFuYXRvbXkgdmlkZW9zhttps://link.springer.com/chapter/10.1007/978-1-61779-779-8_13</li> </ul>
Midbrain and Diencephalon	<ul> <li>Identify and describe the gross features of Pons on a given specimen/model</li> <li>Identify and describe internal structure of pons on cross sectional diagrams.</li> <li>Describe the boundaries and relations of 4th ventricle</li> <li>Describe the anatomical basis of trauma, cerebral aqueduct stenosis and vascular lesions of midbrain.</li> </ul>	<ul> <li>Snell's Clinical Neuroanatomy 8th Edition, pg no. 209, 363-372</li> <li><a href="https://www.youtube.com/watch?v=auogbJFitmI&amp;p">https://www.youtube.com/watch?v=auogbJFitmI&amp;p</a>         p=ygUSY25zIGFuYXRvbXkgdmlkZW9z         <a href="https://link.springer.com/chapter/10.1007/978-3-319-60187-8_8">https://link.springer.com/chapter/10.1007/978-3-319-60187-8_8</a></li> </ul>
Cerebrum & Ventricular system	<ul> <li>Identify and describe the gross structure of thalamus, epithalamus and subthalamus</li> <li>Enlist nuclei of thalamus, epithalamus &amp; subthalamus and describe their functions</li> <li>Identify and describe the functions of tuber cinereum and mamillary bodies</li> <li>Describe the relations and boundaries of ventricles</li> <li>Describe the formation of choroid plexus in ventricles</li> <li>Explain the function, production, circulation, and absorption of cerebrospinal fluid</li> <li>Explain the causes of overproduction and blockage of CSF</li> </ul>	<ul> <li>Snell's Clinical Neuroanatomy 8th Edition, pg no. 249-277, 436-462</li> <li><a href="https://www.youtube.com/watch?v=auogbJFitml&amp;pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z">https://www.youtube.com/watch?v=auogbJFitml&amp;pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z</a> </li> <li><a href="https://link.springer.com/article/10.1007/BF00344">https://link.springer.com/article/10.1007/BF00344</a> </li> <li><a href="https://www.tandfonline.com/doi/full/10.1080/10255840701492118">https://www.tandfonline.com/doi/full/10.1080/10255840701492118</a></li> </ul>
Canial Nerves 1-7	<ul> <li>Identify the nuclei and connections of CN 1,2,3,4,&amp; 6</li> <li>Trace the pathway and perform reflexes associated with of CN 1,2,3,4,&amp; 6</li> </ul>	<ul> <li>Snell's Clinical Neuroanatomy 8th Edition, pg no. 323-361</li> <li><a href="https://www.youtube.com/watch?v=auogbJFitml&amp;">https://www.youtube.com/watch?v=auogbJFitml&amp;</a></li> </ul>

	<ul> <li>Describe the anatomical basis of lesions of visual pathway and ophthalmoplegias</li> <li>Identify the nuclei and connections of CN 5 &amp; 7</li> <li>Trace the pathway and perform reflexes associated with of CN 5 &amp; 7</li> <li>Describe the anatomical basis of upper and lower motor neuron lesion of CN 5 and trigeminal neuralgia</li> </ul>	pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z  https://link.springer.com/referenceworkentry/10.1 007/978-3-540-29678-2_1315
Cranial Nerves 8-12, Basal Ganglia, Limbic system and Reticular Formation	<ul> <li>Identify the nuclei and connections of CN 8-12</li> <li>Trace the pathway and perform reflexes associated with of CN 8-12</li> <li>Discuss the anatomical basis of vertigo, nystagmus, deafness, tinnitus, taste and gag reflex</li> <li>Discuss the anatomical basis of paralysis of muscles supplied by accessory and hypoglossal nerves</li> <li>Enlist components and connections of limbic system</li> <li>Discuss functions of limbic system</li> <li>Describe the connections of limbic system</li> <li>Enlist components of reticular system</li> <li>Discuss functions of reticular system</li> <li>Describe the connections of reticular system</li> <li>Discuss the anatomical basis of loss of consciousness, schizophrenia, Kluver-Bucy syndrome and temporal lobe dysfunction</li> </ul>	<ul> <li>Clinically Oriented Anatomy 9th Edition, pg no. 299-308, 310- 321, 323-361.</li> <li>https://www.youtube.com/watch?v=auogbJFitmI&amp;pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z</li> <li>https://link.springer.com/referenceworkentry/10.1007/978-3-540-29678-2_1315</li> <li>https://link.springer.com/book/10.1007/978-1-4615-1235-6</li> </ul>

## **Physiology Self-Directed Learning (SDL)**

Topics	Learning objectives	Learning Resources
Pathways for transmitting somatic signals	<ul> <li>Classify somatic senses</li> <li>Describe the sensory pathways for transmission of somatic sensations to central nervous system.</li> <li>Enumerate sensations carried by dorsal column system and anterolateral system</li> <li>Describe the characteristics of transmission in the dorsal column medial lemniscal system and anterolateral system</li> <li>Compare and contrast dorsal column medial lemniscal system and anterolateral system</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.         Central and Peripheral Neurophysiology Section 02         (Chapter 08, Page 168)</li> <li>Physiology by Linda S. Costanzo 6th Edition.         Neurophysiology (Chapter 03. Page 82)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th         Edition. Section 09.(Chapter 48, Page 601,609)</li> <li>https://youtu.be/432AD7JZnKE</li> <li>https://www.osmosis.org/learn/Somatosensory_pathways</li> </ul>

Somatosensory cortex & lesions of Somatosensory cortex	<ul> <li>Explain cortical mapping &amp; association cortex</li> <li>Describe lesions of somatosensory areas</li> <li>Summarize role of thalamus in somatic sensations</li> <li>Interpret the importance of dermatomes</li> </ul>	<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th         Edition.(Chapter 48,Page 603)</li> <li>https://nba.uth.tmc.edu/neuroscience/m/s2/chapter04.htm         1</li> <li>https://teachmeanatomy.info/neuroanatomy/pathways/asc         ending-tracts-sensory/</li> </ul>
Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function	<ul> <li>Describe general organization of autonomic nervous system</li> <li>Enumerate the functions of autonomic nervous system</li> <li>Describe sympathetic and parasympathetic nervous system</li> <li>Enumerate &amp; explain their receptors, neurotransmitters &amp; physiological effects</li> <li>Describe physiological anatomy &amp; effects of adrenal medulla</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.         (Chapter 13, Page 255,259)</li> <li>Physiology by Linda S. Costanzo 6th Edition.         Autonomic Nervous System(Chapter 02. Page 47,59)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH         Edition.The Central Nervous System (Chapter 11 Page 392)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th         Edition. Section 09.(Chapter 61, Page 763,765)</li> <li>.         <ul> <li>https://www.kenhub.com/en/library/anatomy/autonom ic-nervous-system</li> <li>https://youtu.be/j9pUItHAAhs 7</li></ul></li></ul>
Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation	<ul> <li>Briefly explain physiological actions of ANS, vasomotor tone, vagal tone &amp; sympathetic stress response</li> <li>Draw a table showing autonomic effects on various body organs</li> <li>Briefly describe the pharmacology of autonomic nervous system</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. (Chapter 13, Page 264)</li> <li>Physiology by Linda S. Costanzo 6th Edition. Autonomic Nervous</li> <li>System(Chapter 02. Page 55)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. The Central Nervous System (Chapter 11 Page 397)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 09.(Chapter 61, Page 768)</li> <li>https://youtu.be/7pGKa-1tSJw</li> <li>https://www.kenhub.com/en/library/anatomy/autonomicnervous-system</li> <li>https://www.diffen.com/difference/Parasympathetic_nervous_system_vs_Sympathetic_nervous_system</li> </ul>

, Blood brain barrier, Blood CSF Barrier, Lumber puncture	<ul> <li>Describe briefly the physiological anatomy of cerebral blood flow</li> <li>Explain cerebrospinal fluid system</li> <li>Describe the CSF pressure, its</li> <li>measurement by lumbar puncture, &amp; hydrocephalus</li> <li>Explain blood CSF barrier</li> <li>&amp; BBB</li> <li>Describe brain edema</li> </ul>	<ul> <li>Physiology by Linda S. Costanzo 6th Edition.         Neurophysiology (Chapter 03. Page 113)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th         Edition. Section 09.(Chapter 62, Page 777-784)</li> <li><a href="https://youtu.be/f9xi1Rf5m9w">https://youtu.be/f9xi1Rf5m9w</a></li> <li>https://www.sciencedirect.com/topics/neuroscience/blood-cerebrospinal-fluid-barrier</li> </ul>
Limbic system, Functions of hypothalamus	Describe the concept of limbic system	<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition</li> <li>https://youtu.be/h3K9RfGw8sI</li> <li>https://www.endocrineweb.com/endocrinology/overview -hypothalamus</li> </ul>
Learning and memory	<ul> <li>Define memory &amp; classify its various types</li> <li>Describe role of synaptic inhibition and synaptic facilitation in memory Explain mechanism of short term, intermediate and long-term memory Describe mechanism of consolidation of memory Enumerate specific parts of brain involved in memory</li> <li>Explain the role of each part</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.         Section 02 (Chapter 15, Page 283)</li> <li>Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 112)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH         Edition.The Central Nervous System (Chapter 09 Page 332)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th         Edition. Section 09.(Chapter 58, Page 735)</li> <li>https://youtu.be/EqdsQDM5Fys</li> <li>https://www.sciencedirect.com/topics/psychology/learning-and-memory</li> </ul>
Concept of Association areas, Concept of Dominant and non-dominant cerebral hemispheres	<ul> <li>Draw association areas of brain</li> <li>Describe association areas of brain regarding their physiological role</li> <li>Explain briefly the clinical features, if</li> <li>the association areas become damaged</li> <li>Describe concept of dominant hemisphere</li> <li>Enlist role of parietooccipito temporal cortex in non-dominant hemisphere</li> </ul>	<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.</li> <li>Section 09.(Chapter 58, Page 727)</li> <li>https://my.clevelandclinic.org/health/articles/23073-cerebral-cortex https://youtu.be/2Z425-CHY1c</li> </ul>
Speech and aphasia	<ul> <li>Describe sensory and motor aspects of communication Define Wernicke's aphasia, Motor aphasia &amp; Global aphasia</li> <li>Explain Wernicke's aphasia, Motor aphasia &amp; Global</li> <li>aphasia</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.         (Chapter 15, Page 290,293)</li> <li>Physiological Basis of Medical Practice by Best &amp;         Taylor's.13th Edition. (Chapter 70, Page 1211)</li> <li><a href="https://www.sciencedirect.com/science/article/abs/pii/S0">https://www.sciencedirect.com/science/article/abs/pii/S0</a></li> </ul>

	Describe function of corpus callosum & anterior commissure in transferring information between two cerebral hemispheres	• https://www.stroke.org.uk/what-is-aphasia/types-of-aphasia
EEG and epilepsy	<ul> <li>Describe brain waves</li> <li>Enumerate different types of brain wave</li> <li>Explain the origin of different brain waves</li> <li>Describe EEG</li> <li>Define epilepsy</li> <li>Enumerate various types of epilepsy</li> <li>Explain various types of epilepsy</li> <li>Describe role of norepinephrine, serotonin and</li> <li>dopamine in psychotic disorders</li> <li>Describe the causes, symptoms &amp; treatment of depression &amp; bipolar disorder</li> <li>Discuss causes, types, symptoms and treatment of</li> <li>Schizophrenia</li> <li>Define Alzheimer's disease. Mention its causes, clinical features, incidence and treatment</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 14, Page 275)</li> <li>Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 42)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 70, Page 1209)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 09.(Chapter 60, Page 756)</li> <li>https://www.webmd.com/epilepsy/guide/types-epilepsy https://youtu.be/T7MKIPYiL48</li> </ul>
Reticular activating system and sleep	<ul> <li>Describe activating driving system of the brain Explain the reticular activating system Discuss the control of cerebral activity by signals from brain stem Explain neurohormonal system of the brain</li> <li>Define sleep and enumerate types of sleep</li> <li>Compare and contrast between two types of sleep Describe the basic theories of sleep in detail</li> <li>Explain physiological effects</li> <li>of sleep</li> <li>Describe sleep and wakefulness cycle</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 14, Page 269,272,278)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Sensory Physiology (Chapter 10 Page 344)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 70, Page 12031208)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 09.(Chapter 60, Page 753)</li> <li>https://youtu.be/TdGQvWAZ0Cs</li> <li>https://www.physio-pedia.com/Reticular Formation</li> </ul>
Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity	<ul> <li>Describe muscle spindle &amp;</li> <li>Golgi tendon organ in detail</li> <li>Explain the receptor function of the Muscle Spindle &amp; Golgi tendon organ</li> <li>Draw muscle spindle and Golgi tendon organ showing the sensory and motor innervation</li> <li>Explain the dynamic and static response of muscle spindle &amp; Golgi tendon organ</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.         Section 02 (Chapter 12, Page 229,234)</li> <li>Physiological Basis of Medical Practice by Best &amp;         Taylor's.13th Edition. (Chapter 68, Page 476)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th         Edition. Section 09.(Chapter 55, Page 686,691)</li> <li>https://www.osmosis.org/learn/Muscle_spindles_and_go         lgi_tendon_organs https://youtu.be/CzeAcc39Cyo</li> </ul>

	<ul> <li>Briefly describe muscle stretch reflex</li> <li>Draw the neuronal circuitry of the stretch reflex</li> <li>Explain the static and dynamic components of stretch reflex</li> <li>Discuss the clinical applications of stretch reflex</li> <li>Explain negative stretch reflex</li> <li>Explain lengthening reaction and its significance</li> <li>Describe role of muscle spindle and Golgi tendon organ in voluntary muscle</li> <li>activity</li> <li>Explain the role of alpha gamma co activation</li> </ul>	
Motor cortex & physiological importance of neocortex, Corticospinal or pyramidal tract, Extra pyramidal system	<ul> <li>Briefly describe motor areas in cortex</li> <li>Draw motor &amp; somatic association areas of motor cortex</li> <li>Explain functions of motor &amp; somatic association areas</li> <li>Explain allocortex &amp; neocortex</li> <li>Describe medial and lateral descending pathways</li> <li>Explain transmission of signals from motor cortex to muscle</li> <li>Draw course of pyramidal tract</li> <li>Enlist the functions of pyramidal tract</li> <li>Mention the effects of lesions in Corticospinal tract</li> <li>Briefly describe extra pyramidal descending tracts</li> <li>Describe rigidity and</li> <li>spasticity</li> <li>Describe location and function of red nucleus</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition. Section 02</li> <li>(Chapter 12, Page 237,240)</li> <li>Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 110)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition.</li> <li>Section 09.(Chapter 56, Page 697)</li> <li>https://www.physiopedia.com/Extrapyramidal_and_Pyramidal_Tracts https://youtu.be/B88BNYWVkWE</li> </ul>
Basal Ganglia & Lesions	<ul> <li>Describe location and function of red nucleus</li> <li>Describe physiological anatomy of basal ganglia</li> <li>Draw neuronal circuits of basal ganglia</li> <li>Explain the role of neuronal circuits in functioning of basal ganglia</li> <li>Enlist and explain the physiological role of neurotransmitters in basal ganglia system</li> <li>Enumerate the clinical abnormalities caused by damage to basal ganglia</li> <li>Briefly explain Parkinson disease</li> <li>regarding its causes, signs and symptoms &amp; treatment</li> <li>Explain Huntington's Chorea regarding its causes, signs and symptoms</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25TH Edition.         Section 02 (Chapter 12, Page 243)</li> <li>Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 110)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13th Edition. (Chapter 69, Page 1194)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14th Edition. Section 09.(Chapter 57, Page 720)</li> <li>https://youtu.be/hxvep2Y8ShI</li> <li>https://www.sciencedirect.com/science/article/pii/S2214 751923000026         https://teachmeanatomy.info/neuroanatomy/structures/b asal-ganglia/</li> </ul>

## **Biochemistry Self-Directed Learning (SDL)**

Topics	Learning objectives	Learning Resources
Chylomicron metabolism	Describe synthesis of chylomicron, its breakdown and factors affecting it	Lippincott Biochemistry Chapter. 18 page 253 <a href="https://www.ncbi.nlm.nih.gov/books/NBK305896/">https://www.ncbi.nlm.nih.gov/books/NBK305896/</a>
HDL & LDL metabolism	<ul> <li>Explain composition functions and clinical significance of LDL &amp; HDL</li> <li>Illustrate mechanism of revise cholesterol synthesis</li> </ul>	<ul> <li>Lippincott Biochemistry Chapter. 18 page 253</li> <li><a href="https://www.alilamedicalmedia.com/-/g">https://www.alilamedicalmedia.com/-/g</a></li> </ul>
Fatty acid oxidation	Describe steps enzymes energy calculation of Beta oxidation of saturated fatty acid	<ul> <li>Lippincott Biochemistry Chapter. 16 page 213</li> <li><a href="https://ninjanerd.org">https://ninjanerd.org</a></li> </ul>
Synthesis &Interconversion of Ketone Bodies, Regulation of Ketogenesis, Ketolysis	Explain synthesis and breakdown of ketone bodies and related disorders	<ul> <li>Lippincott Biochemistry Chapter. 27 page 411</li> <li><a href="https://youtu.be/GuSqOsm3QV8">https://youtu.be/GuSqOsm3QV8</a></li> </ul>
Synthesis of Cholesterol and its regulation	Describe steps regulation and related disorders of cholesterol synthesis	<ul> <li>Lippincott Biochemistry Chapter. 18 page 244</li> <li><a href="https://youtu.be/y9zsDFdMvZY">https://youtu.be/y9zsDFdMvZY</a></li> </ul>

## **Histology Practicals Skill Laboratory (SKL)**

Practical	At The End Of This Skill Lab, Should Be Able To	Learning	Teaching	Assessment
	Illustrate:	Domain	Strategy	Tools
	Identify the microscopic features of ganglia	P	1	
	Illustrate histological picture of ganglia	C2		
Ganglia	List two points of identification	C1	Skills lab	OSPE
	• Correlate with the clinical conditions & cross sections.	C3	SKIIIS IAU	VIVA
Gungna	• Understand curative and preventive health care measures.	C3		V I V / I
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Identify the microscopic features of peripheral nerve on given histological slide	Р		
	Illustrate histological picture of peripheral nerve	C2		
Peripheral nerve	List two points of identification	C1	Skills lab	OSPE
	Correlate with the clinical conditions & cross sections.	C3		VIVA
	• Understand curative and preventive health care measures.	C3		
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Identify histological slide of spinal cord	P		
	Illustrate histological picture of spinal cord	C2		
	List two points of identification	C1		0.000
Spinal cord	• Correlate with the clinical conditions & cross sections.	C3	Skills lab	OSPE
	• Understand curative and preventive health care measures.	C3		VIVA
	Practice the principles of bioethics.	C3		
	Apply strategic use of A.I in health care.	C3		
	Read relevant research article.	C3		
	Identify the microscopic features of cerebellum	P		OSPE
Cerebellum	Illustrate histological picture of cerebellum	C2	Skills lab	VIVA
	List two points of identification	C1		
	Correlate with the clinical conditions & cross sections.	C3		
	• Understand curative and preventive health care measures.	C3		

Practice the principles of bioethics.	C3	
• Apply strategic use of A.I in health care.	C3	
Read relevant research article.	C3	

## **Physiology Practicals Skill Laboratory (SKL)**

Practical	At The End Of This Skill Lab, Should Be Able To	Learning	Teaching	Assessment	References
	Illustrate:	Domain	Strategy	Tools	
	Apparatus identification	C1			
	Principle	C1			Practical Notebook of
Examination of sensory	• Procedure	A, P	Skill lab	OSPE	Physiology Second year
nervous system	<ul> <li>Precautions</li> </ul>	P			MBBS by Dr Saqib Sohail
	<ul> <li>Recall sensations transmitted by sensory pathways</li> </ul>	C1			
	<ul> <li>Recall the effects of lesions of these pathways</li> </ul>	C1			
Examination of motor	<ul> <li>Apparatus identification</li> </ul>	C1			Practical Notebook of
nervous system	Principle	C1	Skill lab	OSPE	Physiology Second year
	<ul> <li>Procedure</li> </ul>	A,P			MBBS by Dr Saqib Sohail
	<ul> <li>Precautions</li> </ul>	P			
	<ul> <li>Recall descending pathways &amp; their functions</li> </ul>	C1			
	<ul> <li>Recall effects of lesions of these pathways</li> </ul>	C1			
	Apparatus identification	C1			Practical Notebook of
	Principle	C1	1		Physiology Second year
Examination of	Procedure	A,P			MBBS by Dr Saqib Sohail
cerebellar System	<ul> <li>Precautions</li> </ul>	P	Skill lab	OSPE	
	<ul> <li>Recall functions of cerebellum &amp; effects of lesions of cerebellum/</li> </ul>	C3			
	Apparatus identification	C1			Practical Notebook of
	Principle	C1			Physiology Second year
Ophthalmoscopy	Procedure	A,P	Skill lab	OSPE	MBBS by Dr Saqib Sohail
	• Precautions	P	1		
	Clinical Correlation	C1	1		
	Apparatus identification	C1			

	Principle	C1				
Determination of Eye	Procedure	A,P	]		Practical Notebook of	
field	Precautions	P	Skill lab	OSPE	Physiology Second year	
	Clinical Correlation	C3			MBBS by Dr Saqib Sohail	
	Apparatus identification	C1				
	Principle	C1	1			
Recording of body	Procedure	A,P	Skill lab		Practical Notebook of	
temperature	• Precautions	P	1	OSPE	Physiology Second year	
	Record oral, axillary & rectal temperature	C1	]		MBBS by Dr Saqib Sohail	
	Recall abnormalities of body temperature	C1	]			
	Apparatus identification	C1	Skill lab			
Examination of	Principle	C1		Skill lab OSPE		
superficial & deep	Procedure	A,P			Practical Notebook of Physiology Second year	
reflexes	Precautions	P				
	Recall reflex arc	C1			MBBS by Dr Saqib Sohail	
	Recall effects of UMNL & LMNL on reflexes	C1				
	Apparatus identification	C1				
	Principle	C1				
Examination of 3 <sup>rd</sup> , 4 <sup>th</sup>	Procedure	A,P			Practical Notebook of	
& 6 <sup>th</sup> cranial nerves	Precautions	P	Skill lab	OSPE	Physiology Second year	
	Recall functions & pathways of various cranial nerves	C1			MBBS by Dr Saqib Sohail	
	Recall effects of lesions of cranial nerves	C1				
	Apparatus identification	C1				
Examination of 5 <sup>th</sup> , &	Principle	C1				
7 <sup>th</sup> cranial nerves	Procedure	A,P	Skill lab	OSPE	Practical Notebook of	
/ Examination of 8 <sup>th</sup> , 9 <sup>th</sup> , 10, 11 <sup>th</sup> , 12 <sup>th</sup>	Precautions	P			Physiology Second year	
	Recall functions & pathways of various cranial nerves	C1			MBBS by Dr Saqib Sohail	
cranial nerves	Recall effects of lesions of cranial nerves	C1				

## **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Color Test For Sterols	Perform Color test four sterols	P	Skill Lab	OSPE
Detection of Cholesterol Crystals	Perform cholesterol Crystals Deduction Test.	P	Skill Lab	OSPE
Estimation of serum TAGS	Perform triglyceride estimation	P	Skill Lab	OSPE
Estimation of Serum HDL	Perform HDL Estimation	P	Skill Lab	OSPE
Lipid Solubility & Acrolein test	Perform Lipid Solubility & Acrolein test.	Р	Skill Lab	OSPE

## **Basic and Clinical Sciences (Vertical Integration)**

#### Content

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

# **Case Based Learning Objectives (CBL)**

Subject	Topic	At the End Of Lecture Students Should Be Able To	Learning
			Domain
	Cystic Astrocytoma of cerebellum	Apply basic knowledge of subject to study clinical case.	C3
Anatomy	Stroke	Apply basic knowledge of subject to study clinical case.	C3
DI 1.1	• CVA	Apply basic knowledge of subject to study clinical case.	C3
Physiology	Gullain Barr syndrome	Apply basic knowledge of subject to study clinical case.	C3
	• IHD	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	Respiratory Distress Syndrome	Apply basic knowledge of subject to study clinical case.	C3

# Vertical Integration LGIS Pathology

Topic	At the end of this LGIS students of should be able to:	Learning Domain	Teaching Strategy	Assessment Tool
	Describe edema ,herniation and hydrocephalous	C2		
Patterns of injury in	Classify cerebrovascular diseases	C2	LGIS	MCQ'S
nervous system	Explain CNS trauma	C2		
	Identify Congenital malformation	C1		
Diseases of myelin and neurodegenerative diseases	<ul> <li>Students should be able to</li> <li>describe the pathophysiology and histomorphology of Alzheimer's disease, Parkinson's Disease, Huntington's disease and Multiple sclerosis</li> </ul>	C2	LGIS	MCQ'S
Meningitis	<ul> <li>Classify types of meningitis</li> <li>Enlist causes of meningitis</li> <li>Describe lab diagnosis of meningitis</li> <li>Enlist complication of meningitis</li> </ul>	C2 C1 C2 C2	LGIS	MCQ'S

## Pharmacology

Topic	At the end of this LGIS students of should be able to:	Learning Domain	Teaching Strategy	Assessment Tool
	List the major neurotransmitters in the CNS	C1		
Introduction to CNS	List the major classes of receptors for each of the primary neurotransmitters and their associated relevant disorders	C1	LGIS	MCQ
Pharmacology	Identify the special considerations associated with CNS drug delivery	C1		
	Cite main drug groups acting on the CNS	C1		

## Medicine

Topic	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Stroke	Discuss pathophysiology, Blood supply of brain (Anterior and posterior Circulation), which part of brain supplied by various arteries, Physiology of brain pathways (Corticospinal and Corticobulbar pathways), Types of Stroke, clinical	C1 C2	LGIS	MCQs
Spinal Cord and Peripheral Nervous system	<ul> <li>Various types of pathways and cells, Peripheral Nerves and neuromuscular junction, difference between upper and lower motor neurons, various types of Plegias (Paraplegia, Hemiplegia, Quadriplegia), Various types of neuropathies and myasthenia Gravis and discuss pathophysiology</li> </ul>	C1 C2	LGIS	MCQs
Cerebellar Disorders	Brain parts involved in Movement and Co-ordination, how movements are brought about, possible lesions and discuss pathophysiology, types of disorders, clinical features, management	C1 C2	LGIS	MCQs
Meningitis	<ul> <li>Define and discuss pathophysiology and discuss symptoms and signs</li> <li>Discuss the causes</li> <li>Describe the management</li> </ul>	C1 C2 C2	LGIS	MCQs
Epilepsy and other convulsive disorders	<ul><li>Define and discuss pathophysiology</li><li>Discuss the causes</li></ul>	C1 C2	LGIS	MCQs

	Describe the management	C2		
	Define and discuss and discuss pathophysiology, symptoms and signs	C1		
Encephalitis	• Discuss the causes	C2	LGIS	MCQs
	Describe the management	C2		

# Surgery

Topic	At The End Of This LGIS, Second Year MBBS Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
	Classify Brain Tumors	C1		
Brain tumors	Outline clinical features of brain tumors.	C1	LGIS	MCQ
	Approach towards a SOL brain			
	Define Brain Abscess	C1		
Brain abscess	Outline clinical features of brain abscess	C1	LGIS	MCQ
	Define head injury	C1		
	Mechanism of Head injury	C1		
Head injury	Clinical features of head injury	C1	LGIS	MCQ
	Glassgow coma Scale	C1		
	Define polytrauma	C1		
Poly trauma	Describe triage	C1	LGIS	MCQ
Patient	ATLS Protocol	C1		

## **Obstetrics & Gynecology**

Topic	At The End Of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
	Enumerate common neurological disorders during pregnancy (eclampsia, epilepsy)	C1	LGIS	MCQs
Seizures during pregnancy(eclampsia/e pilepsy)	Understand neurological changes leading to eclampsia and epilepsy	C1		
	Understand the effects of epilepsy and anti-epileptic drugs on mother and fetus	C1		
	Comprehend the principles of management of epilepsy during pregnancy	C1		

## **Pediatrics**

Topic	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
	Scenario of a patient with fever & fits			
	Define meningitis.	C1		
	Discuss Epidemiology &Pathophysiology	C1		
	Discuss Etiological organisms at different ages	C1		
Meningitis	Discuss Clinical features	C1	LGIS	MCQs
	Discuss Diagnosis & Management	C1		
	Discuss Complications & prognosis	C1		
	Discuss Prevention of meningitis	C1		
	Scenario of a Cerebral Palsy patient			
	Student will be able to know			MCQs
	Discus Brief anatomy of brain	C2		
Cerebral Palsy	Definition of cerebral palsy	C1	1 010	
	Discuss Epidemiology	C2	LGIS	
	Discuss Etiology	C2		
	Discuss Pathophysiology	C2		
	<ul> <li>Discuss Clinical presentation &amp; anatomic classification of Cerebral Palsy</li> </ul>	C2		
	Discuss Associated problems	C2		

	Discuss Management & Prevention	C2		
	Scenario of a patient with acute flaccid paralysis	C1		
	Student will be able to know	C1		
	AFP definition	C1		MCQs
Polio	Discuss Etiology & Epidemiology of Polio	C2	LGIS	
	Discuss Pathogenesis	C2		
	Discuss Clinical features	C2		
	Discuss Management	C2		
	Discuss Complications & sequel	C2		
	Prevention – vaccination	C1		

## Radiology

Practical	At The End Of This Skill Lab, Should Be Able To Illustrate:		Teaching	Assessment
		Domain	Strategy	Tools
	Interprat Normal Skull Radioghraph	C1	LGIS	MCQs
Skull radio graph	Discuss fractures and other diseases with their clinical	C2		
	significance			
CT- scan brain	CT- scan brain • Interpret normal anatomical structures		LGIS	MCQs
MRI & CT Scan	MRI & CT Scan • List some indications for contrast enhanced MRI and CT		LGIS	MCQs
CT scan	Discriminate between a subdural and epidural hematoma at CT	C2	LGIS	MCQs
	(4) Describe imaging signs of a subarachnoid hemorrhage			

## **ENT**

Topic	At The End Of This LGIS, Second Year MBBS	Learning	Teaching	Assessment
	Students Should Be Able To:	Domain	Strategy	Tools
Acoustic neuroma	Recognize signs and symptoms of acoustic neuroma	C1	LGIS	MCQs

## Ophthalmology

Topic	At The End Of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
Chalazion	Discuss in detail the clinical features and management	C2	LGIS	MCQs
Strabismus	Discuss in detail the clinical features and management	C2	LGIS	MCQs

## **List of CNS Module Vertical Courses Lectures**

Date/Day	Department	Time	Week	<b>Topic Of Lectures</b>	Teachers
29-07-2024	Pharmacology	11:20AM – 12:10 PM	1st Week	Introduction to CNS pharmacology	Dr. Omaima Asif (Even)
Monday	(LGIS)				Dr Arsheen (Odd)
02-08-2024	Pediatrics (LGIS)	08:00AM - 09:00 AM	1st Week	Meningitis	Dr. Mamoona Qudrat (Even)
Friday	, ,				Dr. Tanzeela Rani (Odd)
03-08-2024	Pathology (LGIS)	10:30AM – 11:20 AM	1st Week	Introduction to ANS ,Basic	Dr. Nida Fatima (Even)
Saturday				Characteristics of Sympathetic &	
				Parasympathetic System	
				Meningitis	Dr. Kiran Ahmad (Odd)
05-08-2024	Pathology (LGIS)	11:20AM - 12:10 PM	2 <sup>nd</sup> Week	Patterns of injury in nervous system	Dr. Nida Fatima (Even)
Monday					Dr Kiran Ahmad (Odd)
07-08-2024	Surgery (LGIS)	11:20AM - 12:10 PM	2 <sup>nd</sup> Week	Spinal injury and Head injury	Dr. Soban Sarwar Gondal (Even)
Wednesday					Dr. Usman Malik (Odd)
08-08-2024	Radiology (LGIS)	10:30AM – 11:20 AM	2 <sup>nd</sup> Week	Skull Radiograph	Dr Riffat (Even)
Thursday					Dr Saba (Odd)
09-08-2024	Medicine (LGIS)	08:00AM - 09:00 AM	2 <sup>nd</sup> Week	Spinal cord and peripheral nervous	Dr Javeria Malik (Even)
Friday				system	Dr Riffat (Odd)
10-08-2024	Gynecology	11:00AM – 12:10 PM	2 <sup>nd</sup> Week	Seizures during	Dr Ismat Batool (Even)
Saturday	&OBS (LGIS)			pregnancy(eclampsia/epilepsy)	Dr Sadia Waheed (Odd)
17-08-2024	Medicine (LGIS)	11:20AM – 12:10 PM	3 <sup>rd</sup> Week	Cerebellar disorders	Dr Javeria Malik (Even)
Saturday					Dr Faran Maqbool (Odd)
19-08-2024	Surgery (LGIS)	10:30AM – 11:20 AM	4 <sup>th</sup> Week	Management of hydrocephalus	Dr. Fraz Mehmood (Even)
Monday					Dr. Ammad ul Haq (Odd)
19-08-2024	Medicine (LGIS)	11:20AM – 12:10 PM	4 <sup>th</sup> Week	Epilepsy and other convulsive	Dr Javeria Malik (Even)
Monday				disorders	Dr Faran Maqbool (Odd)
21-08-2024	Medicine (LGIS)	11:20AM – 12:10 PM	4 <sup>th</sup> Week	Encephalitis	Dr Javeria Malik (Even)
Wednesday					Dr Faran Maqbool (Odd)
26-08-2024	Medicine (LGIS)	10:30AM – 11:20 AM	5 <sup>th</sup> Week	Stroke	Dr Javeria Malik (Even)
Monday					Dr Faran Maqbool (Odd)
28-08-2024	Radiology	10:30AM - 11:20 AM	5 <sup>th</sup> Week	CT scan and MRI	Dr Anum Zahoor (Even)
Wednesday				(Brain and Spinal Cord)	Dr Faisal (Odd)
28-08-2024	Surgery (LGIS)	11:20AM – 12:10 PM	5 <sup>th</sup> Week	Poly trauma patient	Dr. Fraz Mehmood (Even)
Wednesday					Dr. Ali Tasaddaq (Odd)

## **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

#### **Content**

- Longitudinal Themes
  - o The Holy Quran Translation
  - o Pak Studies/Islamiyat
  - o Family Medicine
  - o Behavioral Sciences
  - o Biomedical Ethics
  - o Early Clinical Exposure (ECE)

#### **Behavioral sciences**

Topic	At The End Of Lecture Students Should Be Able To		Teaching	Assessment
		Domain	Strategy	Tool
	To be able to define emotions.	C1		
Emotions	To understand the neuroanatomy and neurochemistry of emotion way to	C2	LGIS	MCQs
	deal with emotion			
	To be able to outline the types of memory.	C2		
Memory	To be able to explain the areas in brain responsible for memory storage	C2	LGIS	MCQs
	and Retrieval			

## **Biomedical Ethics**

Topics	At the end of session students should be able to:	Learning	Teaching Strategy	Assessment
		Domains		Tools
	<ul> <li>Analyze ethical dilemmas in healthcare practice</li> </ul>	C3	Short video demonstration	<ul> <li>Assignment based</li> </ul>
	involving breach in principle of autonomy.		on violation of Ethical	assessment
Ethical dilemmas in	• Explain what procedures adopted to maintain patient	C2	principle of autonomy from	involving real life
healthcare practice	autonomy.	C1	suit CBEC Video resources	case scenarios
involving breach in	• Identify situations in which doctor may have to take			under aggregate
principle of autonomy	decisions in the best interest of the patients			Marks.
				(Internal Assessment)
				<ul> <li>Assignment to be</li> </ul>
				uploaded on LMS
	<ul> <li>Analyze ethical dilemmas in healthcare practice</li> </ul>	C3	Short video demonstration	<ul> <li>Assignment based</li> </ul>
Ethical dilemmas in	involving breach in principle of beneficence and non-		on violation of Ethical	assessment
healthcare practice	maleficence	C2	principle of beneficence	involving real life
involving breach in	<ul> <li>Explain what procedures adopted to maintain the</li> </ul>		and non-maleficence from	case scenarios
principle of beneficence	principle of beneficence and non-maleficence in	C1	suit CBEC Video resources	under aggregate
and non-maleficence	challenging situations		Students deliberations and	Marks
	• Identify situations in which a doctor may have to take		reflections	(Internal Assessment)
	decisions in the best interests of the patient		Reflective writing	<ul> <li>Assignment to be</li> </ul>
	considering the principle of beneficence and non-			uploaded on LMS

	maleficence			
Ethical dilemmas practice involving breach in principle of justice	<ul> <li>Analyze ethical dilemmas in healthcare practice involving breach in principle of justice</li> <li>Explain what procedures adopted to maintain the principle of justice in challenging situations</li> <li>Identify situations in which a doctor may have to take decisions in the best interests of the patient considering the principle of justice</li> </ul>	C3 C2 C1	Short video demonstration on violation of Ethical principle of beneficence and non-maleficence from suit CBEC Video resources Students deliberations and reflections Reflective writing	<ul> <li>Assignment based         assessment         involving real life         case scenarios         under aggregate             Marks         (Internal Assessment)             Assignment to be             uploaded on LMS</li> </ul>

## **Family Medicine**

Topic	Learning Objectives At the end of the lecture the student should be able to		Teaching Strategy	Assessment Tool
	Describe presenting complains of patients with Headache			
Approach to a patient with headache	Discuss complications of Headache	C3 LGIS-1		MCQs
	Describe initial treatment of patients with Headache		LGIS-1	
	Know when to refer patient to consultant/ Hospital			

### **Early Clinical Exposure (ECE)**

## **Rotation to Department of Medicine**

Session	Learning Objectives	Teaching
I Cases of stroke	<ul> <li>At the end of the session students will be able to</li> <li>Observe and describe the different types of stroke, including ischemic and hemorrhagic strokes, and explain the pathophysiological changes that occur in the brain as a result of these conditions.</li> <li>Discuss the major risk factors for stroke, such as hypertension, atrial fibrillation, and diabetes, and recognize the early clinical signs and symptoms using the FAST (Face drooping, Arm weakness, Speech difficulties, Time to call emergency services) mnemonic.</li> <li>Describe the initial steps in the management of stroke, including the importance of rapid assessment and intervention, the role of imaging in diagnosis, and the basic treatment strategies for ischemic versus hemorrhagic stroke</li> </ul>	• Bedside Teaching • Duration 1 hour • Conducted by senior faculty member of unit
II Paraplegia	<ul> <li>Outline the anatomical structures of the spinal cord and its functional relationship with the body, understanding how injuries or diseases affecting these areas can lead to paraplegia.</li> <li>Discuss the various etiologies of paraplegia, including traumatic spinal cord injury, tumors, infectious diseases, and degenerative disorders, and explain the pathophysiological mechanisms that result in the loss of motor and sensory functions below the level of injury.</li> <li>Describe the initial clinical assessment of a patient with suspected paraplegia, including the importance of a thorough neurological examination and the use of diagnostic imaging. They will also learn about the basic principles of acute management and the multidisciplinary approach needed for long-term rehabilitation.</li> </ul>	<ul> <li>Bedside teaching</li> <li>Duration 1 hour</li> <li>Conducted by senior faculty member of unit</li> </ul>

		Bedside teaching
		<ul> <li>Duration 1 hrs</li> </ul>
III	based on clinical characteristics and brain activity.	<ul> <li>Conducted by</li> </ul>
Vegetative state	<ul> <li>Identify and explain the various causes that can lead to a vegetative state, including traumatic brain injury, severe brain hypoxia, and major neurological diseases, and discuss the underlying pathophysiological changes in the brain.</li> </ul>	senior faculty member of unit
	<ul> <li>Describe assessment techniques used to determine the extent of brain function, the typical medical care provided, and the ethical challenges involved in decisions about long-term care, including discussions on quality of life and end-of-life decisions.</li> </ul>	

## **Rotation to Department of Surgery/ Neurosurgery**

Session	Learning Objectives	<b>Teaching Strategy</b>
I Head injury	<ul> <li>At the end of the session students will be able to</li> <li>Classify head injuries into major categories such as concussions, contusions, skull fractures, and intracranial hematomas, and understand the mechanisms that typically cause these injuries.</li> <li>Recognize the immediate and delayed signs and symptoms of head injuries, including changes in consciousness, visible head trauma, cognitive impairments, and neurological deficits.</li> <li>Describe the basic pathophysiological changes that occur in the brain following different types of head injuries, such as the cascading effects of brain swelling, the impact of blood-brain barrier disruptions, and neuronal damage.</li> <li>Understand the initial steps in the assessment and management of a patient with a head injury, including maintaining airway, breathing, and circulation, the use of imaging modalities like CT scans to assess internal damage, and the criteria for when to escalate care to neurosurgical interventions.</li> </ul>	<ul> <li>Bedside Teaching</li> <li>Duration 1 hour</li> <li>Conducted by senior faculty member of unit</li> </ul>

II Nerve injuries	<ul> <li>Describe the basic anatomy of peripheral nerves and be able to classify nerve injuries according to severity, using the Sunderland and Seddon classification systems, which categorize injuries based on the extent of damage to nerve fibers and surrounding structures.</li> <li>List the common causes of nerve injuries, including traumatic injuries (such as lacerations and avulsions), compression (from tumors or entrapment syndromes), and iatrogenic injuries (resulting from medical or surgical procedures).</li> <li>Understand how to recognize the clinical manifestations of nerve injuries, such as loss of sensation, motor function, or autonomic dysfunction in the affected area, and how these symptoms correlate with the specific nerve damaged.</li> <li>Discuss the initial steps in the management of nerve injuries, including the importance of a thorough neurological examination, the use of diagnostic tools like electromyography (EMG) and nerve conduction studies, and the principles guiding acute treatment and referral for possible surgical intervention.</li> </ul>	<ul> <li>Bedside teaching</li> <li>Duration 1 hour</li> <li>Conducted by senior faculty member of unit</li> </ul>
	<ul> <li>Define coma as a deep state of unconsciousness and distinguish it from other states such as vegetative state, minimally conscious state, and brain death by understanding the clinical and neurological criteria for each.</li> <li>Explain the underlying pathophysiological mechanisms that can induce coma, including traumatic brain injuries, strokes, brain tumors, infections, and metabolic imbalances. They will also discuss the role of disruptions in the reticular activating system and cerebral cortex in the maintenance of consciousness.</li> <li>Use the Glasgow Coma Scale (GCS) to assess the level of consciousness in a patient, interpreting scores to gauge the severity of the coma and potential outcomes. They will also identify other important clinical signs such as pupillary responses and motor reflexes that help differentiate the cause of coma.</li> <li>Understand the initial diagnostic steps required when assessing a comatose patient, including neuroimaging, blood tests, and possibly lumbar puncture. They will also discuss the basic management principles aimed at preserving life and brain functions.</li> </ul>	<ul> <li>Bedside teaching</li> <li>Duration 1 hrs</li> <li>Conducted by senior faculty member of unit</li> </ul>

### **Rotation to Department of Radiology**

Session	Learning Objectives	Teaching Strategy
I CT scan Brain Normal Stroke Hemorrhage Infarction	<ul> <li>At the end of the session students will be able to</li> <li>Recognize the normal anatomical structures visible on a CT scan of the brain, including the cerebral hemispheres, cerebellum, brainstem, ventricles, and major sulci and gyri. They will also understand the typical appearances of these structures in different slices (axial, coronal, and sagittal).</li> <li>Identify the CT findings associated with ischemic and hemorrhagic strokes, including areas of hypodensity in ischemic stroke and hyper density in hemorrhagic stroke. They will understand the importance of timing in the imaging of stroke for optimal diagnosis and management.</li> <li>Describe the key differences in appearance between brain hemorrhages and infarctions on CT scans. They will be able to describe the characteristics of hemorrhages (e.g., acute intracerebral hemorrhage appearing as a hyperdense area) and infarctions (e.g., loss of cortical definition and the appearance of infarcted areas as hypodense).</li> <li>Interpret CT images in the context of clinical symptoms to make preliminary diagnoses and understand potential</li> </ul>	<ul> <li>Bedside Teaching</li> <li>Duration 1 hour</li> <li>Conducted by senior faculty member of unit</li> </ul>

	management strategies. This objective aims to integrate their radiographic findings with clinical reasoning to enhance their diagnostic acumen.	
II Hydrocephalus	<ul> <li>Define hydrocephalus as the abnormal accumulation of cerebrospinal fluid (CSF) within the ventricles of the brain.</li> <li>Distinguish between the types of hydrocephalus, including communicating, non-communicating (obstructive), and exvacuo, and understand the mechanisms that lead to each type.</li> <li>Identify the common causes of hydrocephalus, such as congenital malformations, infections, tumors, and traumatic injuries.</li> <li>Discuss the pathophysiological changes that occur, focusing on the dynamics of CSF production, flow, and absorption.</li> <li>Describe the clinical manifestations of hydrocephalus, which may vary by age and the rate of CSF accumulation.</li> <li>Discuss the diagnostic tools used to identify hydrocephalus, primarily imaging techniques such as ultrasound in infants, CT scans, and MRIs.</li> <li>Describe the treatment options available, including surgical interventions like ventriculoperitoneal shunt placement and endoscopic third ventriculostomy.</li> </ul>	<ul> <li>Bedside teaching</li> <li>Duration 1 hour</li> <li>Conducted by senior faculty member of unit</li> </ul>
III Brain atrophy	<ul> <li>Define brain atrophy as the loss of neurons and the connections between them, resulting in decreased brain volume. They will differentiate between focal atrophy, which affects specific areas of the brain, and</li> </ul>	<ul> <li>Bedside teaching</li> <li>Duration 1 hrs</li> <li>Conducted by senior faculty</li> </ul>
	generalized atrophy, which involves a	member of unit

	<ul> <li>reduction in the size of multiple brain regions.</li> <li>Identify the various causes of brain atrophy, including neurodegenerative diseases (such as Alzheimer's disease and Parkinson's disease), traumatic brain injuries, stroke, and infectious diseases.</li> <li>Describe the signs and symptoms of brain atrophy, such as cognitive decline, memory impairment, changes in motor skills, and alterations in behavior or personality, depending on the areas of the brain that are affected.</li> <li>Discuss the role of imaging studies, such as MRI and CT scans, in diagnosing brain atrophy, and how these images can be used to assess the extent and pattern of atrophy.</li> <li>Discuss the management approaches aimed at slowing the progression of symptoms and improving quality of life, including pharmacological treatments and supportive therapies.</li> </ul>	
IV Brain Edema	<ul> <li>Define brain edema</li> <li>Distinguish between the two main types of brain edema: cytotoxic edema, which involves fluid buildup within brain cells due to cellular injury, and vasogenic edema,.</li> <li>Identify various causes of brain edema, including traumatic brain injury, ischemic stroke, infections, tumors, and toxic exposures.</li> <li>Describe the clinical signs and symptoms of brain edema, which may include headache, nausea, vomiting, altered consciousness, and neurological deficits such as weakness</li> </ul>	<ul> <li>Bedside teaching</li> <li>Duration 1 hrs</li> <li>Conducted by senior faculty member of unit</li> </ul>

	<ul> <li>or speech disturbances, depending on the severity and location of the edema.</li> <li>Understand the diagnostic techniques used to identify brain edema, primarily imaging studies like CT and MRI scans</li> <li>Discuss the management options available, including medical treatments to reduce swelling (such as corticosteroids and osmotic diuretics), surgical interventions to relieve pressure, and the importance of addressing the underlying cause of the edema.</li> </ul>	
V Skull/ spine Fractures	<ul> <li>Classify the types of skull fractures (such as linear, depressed, diastatic, and basilar) and spine fractures (including compression, burst, flexion-distraction, and fracture-dislocation).</li> <li>Describe the Pathophysiology of Skull and Spine Fractures: Students will explore the pathophysiological implications of these fractures, including potential complications such as intracranial hemorrhage from skull fractures and spinal cord injury from spine fractures. They will examine how the location and severity of the fracture impact neurological outcomes.</li> <li>Identify the clinical manifestations associated with skull and spine fractures. For skull fractures, symptoms may include visible deformities, cerebrospinal fluid leakage from nose or ears, and neurological deficits. For spine fractures, symptoms can include pain, paralysis, loss of sensation, and autonomic dysregulation.</li> <li>Understand the diagnostic procedures used to assess skull and spine fractures, primarily</li> </ul>	<ul> <li>Bedside teaching</li> <li>Duration 1 hrs</li> <li>Conducted by senior faculty member of unit</li> </ul>

	<ul> <li>focusing on imaging techniques like X-rays, CT scans, and MRI.</li> <li>Discuss initial management strategies, including stabilization, neurologic assessment, and when to refer for surgical intervention.</li> </ul>	
VI MRI Brain/ Spine	<ul> <li>Describe the fundamental principles of MRI technology, including how magnetic fields and radio waves are used to create detailed images of the brain and spinal structures.</li> <li>Enlist the key indications for using MRI over other imaging modalities, such as its superior ability to differentiate between soft tissues and its usefulness in diagnosing conditions like tumors, inflammatory diseases, and vascular anomalies.</li> <li>Recognize normal anatomical structures of the brain and spine on MRI scans.</li> <li>Identify common pathological findings, such as signs of herniated discs, spinal stenosis, brain tumors, multiple sclerosis plaques, and evidence of acute or chronic stroke.</li> <li>Develop skills in interpreting MRI features that are specific to neurological conditions,</li> <li>Describe the safety considerations associated with MRI, including the importance of screening for contraindications like implanted metallic devices.</li> </ul>	<ul> <li>Bedside teaching</li> <li>Duration 1 hrs Conducted by senior faculty member of unit</li> </ul>

## **List of CNS Module Spiral Courses Lectures**

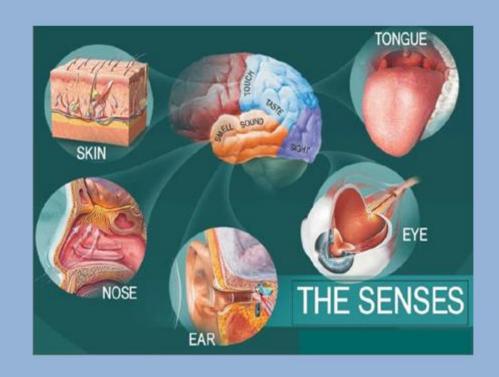
Date/Day	Department	Time	Week	<b>Topic Of Lectures</b>	Teachers
02-08-2024 Friday	Quran Translation	10:00AM – 11:00 AM	1 <sup>st</sup> Week	Imaniyaat-5	Mufti Naeem Sherazi (Odd)
02-08-2024 Friday	Quran Translation	11:00AM – 12:00 PM	1 <sup>st</sup> Week	Imaniyaat-6	Mufti Naeem Sherazi (Even)
09-08-2024	Quran Translation	10:00AM – 11:00 AM	2 <sup>nd</sup> Week	Musawat	Mufti Naeem Sherazi (Even)
Friday				Tehreek-e-Pakistan (1940-1947	Qari Aman Ullah (Odd)
09-08-2024 Friday	Quran Translation	11:00AM – 12:00 PM	2 <sup>nd</sup> Week	Tehreek-e-Pakistan (1940-1947	Qari Aman Ullah (Even)
				Musawat	Mufti Naem Sherazi (Odd)
16-08-2024	Pakstudies/Islamm	10:00AM – 11:00 AM	3 <sup>rd</sup> Week	Khwateen k hakook	Mufti Naem Sherazi (Odd)
Friday	iyat			Qayam e Pakistan, ibtidaimushkilaat	Qari Aman Ullah (Even)
16-08-2024 Friday	Pakstudies/Islamm iyat	11:00AM – 12:00 PM	3 <sup>rd</sup> Week	Qayam e Pakistan, ibtidaimushkilaat Khwateen k hakook	Qari Aman Ullah (Even)  Mufti Naem Sherazi (Odd)
26-08-2024 Monday	Family Medicine (LGIS)	11:20AM – 12:10 PM	5 <sup>th</sup> Week	Approach to a patient with neuronal disease	Dr. Sadia
27-08-2024 Tuesday	Behavioral Sciences (LGIS)	11:20AM – 12:10 PM	5 <sup>th</sup> Week	Memory & Emotions	Dr. M. Azeem Rao (Even) Dr. Zarnain Umar (Odd)
29-08-2024 Thursday	Behavioral Sciences (LGIS)	11:20AM – 12:10 PM	5 <sup>th</sup> Week	Metacognition	Dr. Zarnain Umar (Even) Dr. Ali Tasaddaq (Odd)
30-08-2024 Friday	Quran Translation IV	08:00AM – 09:00 AM	5 <sup>th</sup> Week	Momalat-I	Mufti Naeem Sherazi (Odd)
	Quran Translation V	09:00AM – 10:00 AM		Momalat-II	Mufti Naeem Sherazi (Even)



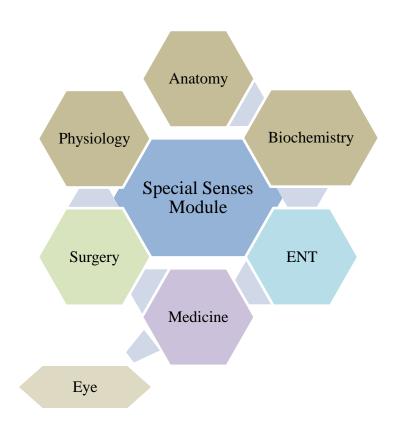


# Rawalpindi Medical University Department of Medical Education (DME)

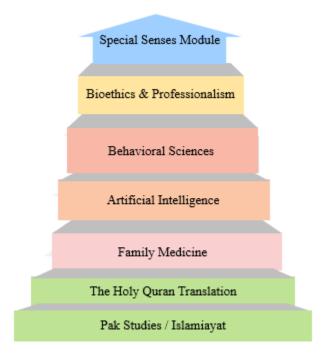
# **Special Senses Module**



### **Integration of Disciplines in Special Senses Module**



### **Spiral / General Education Cluster Courses**



## **Discipline Wise Details of Modular Contents**

Block	Subjects	Embryology	Histology	Histology Practical SKL. Lab.	Gross Anatomy	CBL	SDL
III	• Anatomy	<ul> <li>Development of Eye</li> <li>Development of Pharyngeal arches</li> <li>Development of Ear</li> </ul>	<ul> <li>Histology of Eye</li> <li>Histology of Ear</li> </ul>	<ul> <li>Cornea</li> <li>Retina</li> <li>External and Internal ear</li> </ul>	<ul> <li>Facial and superior aspect of cranium (Norma frontalis, Norma verticalis)</li> <li>External surface of cranial base (Norma basalis)</li> <li>Lateral and occipital aspect of cranium (Norma lateralis, occipitalis)</li> <li>Mandible</li> <li>Temporomandibular joint</li> <li>Face</li> <li>Scalp</li> <li>Orbit boundaries and Extraocular muscles</li> <li>Vessels and nerves of orbit</li> <li>Eyeball</li> <li>Eyelid and lacrimal apparatus</li> <li>Parotid and temporal region</li> <li>Infratemporal fossa</li> <li>Pterygopalatine fossa</li> <li>External and middle ear</li> <li>Inner ear</li> <li>Nose and paranasal sinuses</li> </ul>	<ul> <li>Oculomotor nerve palsy</li> <li>Extra Dural hemorrhage</li> </ul>	<ul> <li>Norma frontalis, verticalis and basalis</li> <li>Lateralis and occipitalis, TMJ &amp; Mandible Orbit boundaries</li> <li>Extraocular muscles</li> <li>Vessels and Nerves of orbit</li> <li>Temporal and Infra temporal region, Pterygopalatin e fossa</li> <li>External and middle ear</li> </ul>
	<ul> <li>Physiology</li> </ul>	Physiology of I	Ear & Eve	-L	- 11050 and parameter stricted	L	
	Biochemistry			Neurotransmitters, Vi	tamin A role in vision		
	•	* *		Spiral Cour			
	<ul> <li>The Holy Quran Translation</li> </ul>	•					
	<ul> <li>Islamiayat</li> </ul>	<ul><li>Imaniat (Hadith</li><li>Zimidaari aur to</li><li>Uswa-e-hasna</li></ul>	aluqaat				
	<ul> <li>Pak Studies</li> </ul>	Pakistan ki jugl	hrafiyai ahmiyat a	aur difai haisiyat			

	Pakistan k hamsaya mumalik se taluqaat      Pakistan k gudrati wasail maadaiyaat
D: 11 1 1 1 1 1 1	Pakistan k qudrati wasail-maadniyaat
<ul> <li>Biomedical Ethics / Professinalism</li> </ul>	Ethical dilemmas Involving breach in Justice
<ul> <li>Behavioral Sciences</li> </ul>	<ul> <li>Perception</li> </ul>
<ul> <li>Radiology &amp; Artificial Intelligence</li> </ul>	General radiologic concepts
Family Medicine	Approach to a patient with earache
	Vertical Integration
• Surgery	Plastic surgery
• ENT	Nasal polyp & Sinusitis & Diseases of External Nose
21,1	Otitis Media Ear Discharge & Hearing Problems in Children
	Facial fractures
Medicine	Management Of Covid-19 Sense of Smell
• Eye	Refractive Errors Strabismus
- 2,0	Ocular trauma & Ocular Procedures
	Conjunctivitis Chalazion
	Cataract & Glaucoma & Anti glaucoma drugs
	Early Clinical Exposure (ECE)
Medicine	Hyperthyroidism
	Hypothyroidism
	• Cushing Syndrome
• Surgery	Thyroid Nodule
<i>5</i>	Multi nodular Goiter
	CA Thyroid
	Graves Diseases
• Eye	Blindness
- 2,0	Visual field defect
	Cataract
<ul> <li>Otolaryngology</li> </ul>	Deafness
- Otolary ingology	<ul><li>Hearing tests</li></ul>
	Nasal Obstruction
	Clinical Themes
	CHIICAL LICHICS

### **Special Senses Module Team**

Module Name : Reproduction Module

Duration of module : 04 Weeks Coordinator : Dr. Rahat

Focal Person Quran Translation

Focal Person Family Medicine

Lectures

Co-coordinator : Dr. Fareed Ullah Reviewed by : Module Committee

Dr. Uzma Zafar

Dr. Sadia Khan

Module Committee				Module Task Force Team				
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Minahil Haq (Senior Demonstrator of Anatomy)			
2.	Director DME	Prof. Dr. Ifra Saeed	2.	DME Focal Person	Dr. Farzana Fatima			
3.	Chairperson Anatomy & Dean Basic	Prof. Dr. Ayesha Yousaf	3.	Co-coordinator	Dr. Sadia Baqir (Senior Demonstrator of Anatomy)			
	Sciences							
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. Romessa (Demonstrator of Biochemistry)			
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Fareed Ullah Khan (Senior Demonstrator of Physiology)			
6.	Focal Person Anatomy Second Year	Dr. Maria Tasleem						
	MBBS							
7.	Focal Person Physiology	Dr. Sidra Hamid		$\mathbf{D}$	ME Implementation Team			
			1.	Director DME	Prof. Dr. Ifra Saeed			
8.	Focal Person Biochemistry	Dr. Aneela Jamil	2.	Assistant Director DME	Dr Farzana Fatima			
9.	Focal Person Pharmacology	Dr. Zunera Hakim	3.	DME Implementation Team	Prof. Dr. Ifra Saeed			
					Dr. Farzana Fatima			
					Dr. Saira Aijaz			
10.	27	Dr. Asiya Niazi	4.	Editor	Muhammad Arslan Aslam			
11.	Focal Person Behavioral Sciences	Dr. Saadia Yasir						
12.	Focal Person Community Medicine	Dr. Afifa Kulsoom						

#### **Module III – Special Senses Module**

**Rationale:** Visual system is a blessing, and no one can underestimate the importance of sight in ones life. It is a highly sensitive system. Unfortunately, it is among the neglected parts of health care and millions of people are getting blind either due to negligence or inappropriate treatment. Refractive errors, cataract, glaucoma and diabetic eye disease are among the ophthalmic diseases which can be easily treated, and morbidity prevented if diagnosed earlier. A young doctor must know how to screen out eye diseases and treat where possible. It is our responsibility to provide them with the required acumen.

Ear, Nose and Throat disorders are very common in the community and form a major portion of clinical practice of a general / family physician. Common ENT problems like phayngitis, tonsillitis, Otitis media, rhinosinusitis, nasal allergy, deafness, vertigo and balance problems can be diagnosed and treated easily. The prevalence of cancer of the upper aerodigestive tract is very high in Pakistan. These patients must be diagnosed and treated at the early stages to reduce morbidity and mortality. Medical students must be made aware of the importance of proper management of ENT problems for the benefit of community and humanity.

#### **Module Outcomes**

By the end of the module, students will be able to:

#### Knowledge

- Integrate the basic knowledge and clinical problems.
- Take detailed history, examine the patients and make a provisional diagnosis with the plan of management.
- Timely refer the patient to an ophthalmologist or ENT specialist.
- Used technology based Medical Education including Artificial Intelligence
- Appreciate concept and importance of Family Medicine, Biomedical Ethics, & Research.

#### **Skills**

- Demonstrate effective skill for performing and interpreting various laboratory tests like pregnancy test.
- Demostrate awareness of ethical, legal and social implecation of issues related to bioethics.

#### **Attitude**

- Demonstrate effective communication skill strategies while interacting with patients.
- Demonstrate teamwork and positive interaction with colleges.
- Demonstrate self learning attitude and problem-solving skills.

### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self-Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



## Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

### **Anatomy Large Group Interactive Session (LGIS)**

Topics	At the end of lecture students should be able to:	Learning	Teaching	Assessment
	Davalanment	<b>Domains</b>	Strategy	Tools
Development of Pharyngeal apparatus	<ul> <li>Define the pharyngeal arch apparatus.</li> <li>Describe components of pharyngeal arches.</li> <li>Enlist derivatives of each of pharyngeal arch.</li> <li>Describe the development of pharyngeal grooves and pharyngeal membranes.</li> <li>Enlist the derivates of pharyngeal pouches and clefts.</li> <li>Enlist common birth defects associated with pharyngeal apparatus.</li> <li>Explain the embryological basis of these defects.</li> <li>Understand the bio-physiological aspects of arches.</li> <li>Correlate with the clinical conditions.</li> <li>understand provision of curative and preventive health care measures.</li> <li>Practice principles of bioethics.</li> <li>Apply strategic use of AI in health care.</li> </ul>	C1 C2 C1 C2 C1 C1 C2 C2 C2 C3 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA OSPE
Development of face, nasal cavities	<ul> <li>Read relevant research article.</li> <li>Describe the developmental stages of face.</li> <li>Discuss the role of neural crest cells in development of facial skeleton and pharyngeal arch derivatives.</li> <li>Describe the molecular regulation of facial development.</li> <li>Discuss the congenital anomalies of face.</li> <li>Describe the development of nasal cavities and paranasal sinuses.</li> <li>Understand the bio-physiological aspects of face &amp; nasal cavities</li> </ul>	C3 C2 C2 C3 C2 C3 C2 C3 C3 C3 C3	LGIS	MCQ SAQ VIVA OSPE

			1	
	<ul> <li>Correlate with the clinical conditions.</li> </ul>	C3		
	<ul> <li>understand provision of curative and preventive health</li> </ul>	C2		
	care measures.			
	<ul> <li>Practice principles of bioethics.</li> </ul>	C3		
	<ul> <li>Apply strategic use of AI in health care.</li> </ul>	C3		
	<ul> <li>Read relevant research article.</li> </ul>	C3		
	Read relevant research article.			
	Discuss the development of primary and secondary	C2		
	palate.	C2		
	±	C1		MCQ
Development of palate	Enlist the different varieties of cleft palate.  Discuss the stiple are of eleft linear deleft palate.	C3	LGIS	SAQ
Development of parace	Discuss the etiology of cleft lip and cleft palate.	C3	LOIS	VIVA
	Describe embryological basis of craniofacial	<b>C</b> 3		OSPE
	anomalies.	C2		OBLE
	• Understand the bio-physiological aspects of Palate.	C3		
	<ul> <li>Correlate with the clinical conditions.</li> </ul>	C3		
	<ul> <li>understand provision of curative and preventive health</li> </ul>	C3		
	care measures.			
	<ul> <li>Practice principles of bioethics.</li> </ul>	C3		
	<ul> <li>Apply strategic use of AI in health care.</li> </ul>	C3		
	<ul> <li>Read relevant research article.</li> </ul>	C3		
		<b>C</b> 3		
	<ul> <li>Describe the different embryological sources of</li> </ul>	C2		
	development of eye.			
	<ul> <li>Describe development of eye field on rostral neural</li> </ul>	C2		MCQ
Development of Eye I	tube.		LGIS	SAQ
(Optic Cup & Retina)	<ul> <li>Enlist derivatives of optic cup and development of</li> </ul>	C1		VIVA
	retina.			OSPE
	<ul> <li>Recall the differentiation of optic grooves and optic</li> </ul>	C2		
	vesicle.			
	<ul> <li>Discuss transformation of optic vesicles into optic</li> </ul>	C2		
	cup.	C2		
	<ul> <li>Describe development of retina.</li> </ul>	C3		
	<ul> <li>Correlate with the clinical conditions.</li> </ul>	C3		
	understand provision of curative and preventive health     care measures.			
	care measures.	C3		
	<ul> <li>Practice principles of bioethics.</li> </ul>			

	<ul> <li>Apply strategic use of AI in health care.</li> <li>Read relevant research article.</li> </ul>	C3		
Development of Eye II (Congenital defects)	<ul> <li>Describe formation of optic stalk.</li> <li>Explain induction of optic placodes and lens primordia.</li> <li>Enumerate neural crest cell and mesenchymal derived eye structures.</li> <li>Enlist the molecular regulation of eye development.</li> <li>Discuss birth defects of the eye.</li> <li>Correlate with the clinical conditions.</li> <li>understand provision of curative and preventive health care measures.</li> <li>Practice principles of bioethics.</li> <li>Apply strategic use of AI in health care.</li> </ul>	C2 C2 C1 C1 C2 C3 C3	LGIS	MCQ SAQ VIVA OSPE
	<ul> <li>Read relevant research article.</li> <li>Explain the development of optic placodes, otic pit, otic vesicle and otic capsule.</li> </ul>	C2		
Development of Ear	<ul> <li>Enlist derivatives of otic vesicle and otic capsule.</li> <li>Describe development of middle ear cavity and Eustachian tube from tubotympanic recess.</li> </ul>	C1 C2 C2		MCQ
Development of Lai	<ul> <li>Describe the development of auditory ossicles, tympanic membrane and mastoid antrum.</li> <li>Discuss development of external acoustic meatus.</li> </ul>	C2	LGIS	SAQ VIVA OSPE
	<ul> <li>Enlist commom congenital anomalies associated with ear development.</li> <li>Describe the embryological basis of these anomalies</li> <li>Correlate with the clinical conditions.</li> </ul>	C1 C2 C3		
	<ul> <li>understand provision of curative and preventive health care measures.</li> </ul>	C3		
	<ul> <li>Practice principles of bioethics.</li> <li>Apply strategic use of AI in health care.</li> <li>Read relevant research article.</li> </ul>	C3 C3		
	Histology			
	<ul> <li>Describe the structural differences between outer, middle and inner ear.</li> </ul>	C2		

	<ul> <li>Discuss the functions of different parts of ear.</li> </ul>	C2		
Histology of Ear	<ul> <li>Distinguish the auditory part of inner ear from the</li> </ul>			
	vestibular system.	C2		MCQ
	<ul> <li>Discuss their roles in hearing &amp; balance</li> </ul>	C2	LGIS	SAQ
	<ul> <li>Describe the fuction of sensory hair cells.</li> </ul>	C2		VIVA
	<ul> <li>Describe the appearance and function of spinal</li> </ul>			OSPE
	ganglia.	C2		
	<ul> <li>Understand the bio-physiological aspects of hearing</li> </ul>	C3		
	<ul> <li>Correlate with the clinical conditions.</li> </ul>	C3		
	<ul> <li>Understand provision of curative and preventive</li> </ul>	C3		
	health care measures.	C3		
	<ul> <li>Practice principles of bioethics.</li> </ul>	C3		
	<ul> <li>Apply strategic use of AI in health care.</li> </ul>	C3		
	<ul> <li>Read relevant research article.</li> </ul>			
	<ul> <li>Discuss the histology of different coats of the eyeball.</li> </ul>	C2		
	<ul> <li>Describe histological sections of sclera &amp; Cornea.</li> </ul>	C2		
	<ul> <li>Describe the histology of choroid, ciliary body and</li> </ul>	C2		MCQ
Histology of Eye I	iris.	C2	LGIS	SAQ
(Fibrous & Vascular	<ul> <li>Discuss histological sections of accessory structures of</li> </ul>			VIVA
coat)	the eye.	C2		OSPE
	<ul> <li>Discuss the histological details of lens chamber &amp;</li> </ul>			
	Vitroeus body.	C2		
	<ul> <li>Understand the bio-physiological aspects of vision</li> </ul>	C3		
	<ul> <li>Correlate with the clinical conditions like glaucoma,</li> </ul>			
	cataract.			
	<ul> <li>understand provision of curative and preventive health</li> </ul>	C3		
	care measures.			
	<ul> <li>Practice principles of bioethics.</li> </ul>	C3		
	<ul> <li>Apply strategic use of AI in health care.</li> </ul>	C3		
	<ul> <li>Read relevant research article.</li> </ul>			
	Describe layers of retina	C2		
	<ul> <li>Discuss retinal pigment epithelium</li> </ul>	C2		
	<ul> <li>Discuss retinal pignicit epithenum</li> <li>Discuss histology&amp; functions of neuronal retina.</li> </ul>	C2		MCQ
Histology of Eye II	<ul> <li>Describe photoreceptors &amp; rod cells.</li> </ul>	C2	LGIS	SAQ
(Retina &	<ul> <li>Understand the bio-physiological aspects of Palate.</li> </ul>	C2		VIVA
Photoreceptors)	<ul> <li>Correlate with the clinical conditions like retinal</li> </ul>			OSPE
• ′	• Contelate with the chinical conditions like fethal			

detachment	C3	
<ul> <li>understand provision of curative and preventive health care measures.</li> <li>Practice principles of bioethics.</li> <li>Apply strategic use of AI in health care.</li> <li>Read relevant research article.</li> </ul>	C2 C3 C3 C3	

## **Physiology Large Group Interactive Session (LGIS)**

Topics	Learning Objectives	References	<b>Learning Resources</b>	Learning Domains	Learning Strategy	Assessment Tools
Introduction to Physiology of Eye & Optics of vision. General Principles of optics, Physiological basis for errors of refraction	<ol> <li>Explain the basic physiology of eye and its refractive surfaces</li> <li>Discuss the physical principles of optics</li> <li>Describe the mechanism of accommodation and its control</li> <li>Describe the errors of refraction (Myopia, hyperopia, astigmatism and their correction by using different lens systems</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 09, Page 177,185)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition,Neurophysiology chapter 3, page 85</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.</li> <li>Sensory Physiology (Chapter 10,Page 374-378)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition,Vision(Chapter 64,Page 1086)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 50, Page 627-635)</li> </ul>	https://www.britan nica.com/science/h uman-eye     https://youtu.be/la EFdlxW0rA	1.C2 2. C2 3. C2 4.C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

Introduction to Physiology of external ear, Middle ear	1.Describe physiology of external ear 2.Describe physiology of middle ear 3. Explain structure of middle ear	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02, (Chapter 10, Page 199)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition,Neurophysiology chapter 3, page 92</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.</li> <li>Sensory Physiology (Chapter 10,Page 364-371)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 53, Page 663)</li> </ul>	https://youtu.be/V RLm7cpmZSk      https://www.scienc edirect.com/scienc e/article/pii/S0378 595522002192	1. C2 2. C2 3. C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Fluid system of the eye Intraocular pressure, Function of the Structural Elements of the Retina	1.Describe the formation and circulation of aqueous humor 2.Explain the mechanism of regulation of intraocular pressure 3.Define glaucoma and its treatment	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 09, Page 178)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition,Vision(Chapter 64,Page 1094)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 50, Page 635) (Chapter 51,Page 639)</li> </ul>	<ul> <li>https://youtu.be/C KtLlOSh8o4</li> <li>https://youtu.be/7C FY4gxLnMY</li> <li>https://my.clevelan dclinic.org/health/ body/24611- aqueous-humor- vitreous-humor</li> </ul>	1. C2 2. C2 3. C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Functions of Inner ear, Physiology of Hearing	<ol> <li>Describe the physiology of hearing and function of tympanic membrane and ossicular system.</li> <li>Define impendence matching and attenuation reflex</li> <li>Explain the conduction of sound waves in the cochlea</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 10, Page 200,204)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition,Neurophysiology chapter 3, page 93</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Sensory</li> </ul>	<ol> <li>https://youtu.be/Ie 2j7GpC4JU</li> <li>https://youtu.be/qg dqp-oPb1Q</li> <li>https://www.urmc. rochester.edu/ency clopedia/content.as px?ContentTypeID =90&amp;ContentID=P 02025</li> </ol>	1. C2 2. C1 3. C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,

Photochemistry of vision &Physiological basis for photo transduction	<ol> <li>Describe the physiology of retinal layers</li> <li>Explain photochemistry of vision (rhodopsin - retinal)</li> <li>Describe the mechanism of activation of Rods</li> <li>Explain the photochemistry of color vision</li> </ol>	<ul> <li>Physiology (Chapter 10,Page 371-374)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 53, Page 664,669)</li> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 09, Page 182)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition,Neurophysiology chapter 3, page 87</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Sensory Physiology (Chapter 10,Page 379-387)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection</li> </ul>	1. <a href="https://www.brainkart.com/article/Pho">https://www.brainkart.com/article/Pho</a> tochemistry-of- Eye- Vision 19676/ 2. <a href="https://youtu.be/k9">https://youtu.be/k9</a> lrM5iPNuY	1. C2 2. C2 3. C2 4. C2	LGIS	MST based Assessment) OSPE  MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Hearing abnormalities, Tuning fork tests and audiometry	<ol> <li>Explain the auditory nervous pathway and abnormalities associated with it.</li> <li>Describe the function of cerebral cortex in hearing.</li> </ol>	<ul> <li>Ouyton &amp; Hall. 14 Edition Section 10. (Chapter 51, Page 641)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's. 13<sup>th</sup> Edition(Chapter 62, Page 1067)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall. 14<sup>th</sup> Edition Section 10. (Chapter 53, Page 672)</li> </ul>	1. https://youtu.be/Fg F91K7dU8Y 2. https://youtu.be/ac YMy9b0F2A 3. https://www.uptod ate.com/contents/i mage?imageKey= PC%2F58032⊤ icKey=PC%2F153 59&source=see_li nk	1. C2 2. C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Light & dark adaptation, Color vision, Neural functions of the	<ol> <li>Explain the neural circuitry of the Retina</li> <li>Describe the physiology of visual pathway</li> <li>Name the optic lesion associated</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 09, Page 189,193)</li> </ul>	1. <a href="https://youtu.be/wi">https://youtu.be/wi</a> 2. <a href="https://youtu.be/cG">https://youtu.be/cG</a> 5ZuK0_qtc	1.C2 2.C2 3.C1	LGIS	MCQ SEQ VIVA VOCE

retina, Central neurophysiology of vision, Neural pathways for analysis of visual information	with visual pathway	<ul> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition, Neurophysiology chapter 3, page 90</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition Section 10. (Chapter 51, Page 644)(Chapter 52, Page 653-657)</li> </ul>	3. <a href="https://teachmeanat.omy.info/head/cra">https://teachmeanat.omy.info/head/cra</a> <a href="mail-nerves/optic-cnii/">nial-nerves/optic-cnii/</a>			MCQ (LMS based Aseessment, MST based Assessment) OSPE
Vestibular system	<ol> <li>Describe the function of the organ of corti</li> <li>Explain vestibular system</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 10, Page 209)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition,Neurophysiology chapter 3, page 95</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition,(Chapter 63,Page 1072)</li> </ul>	1.  https://www.physi  o- pedia.com/Vestibu lar_System  2. https://youtu.be/ry GMI3SpxCE  3. https://youtu.be/mc p7qLh8_5c	1. C2 2. C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Lesions of visual pathway and its effects on field of vision, Movements of eye ball along with neural control	<ol> <li>Explain the muscular control of eye movement</li> <li>Describe the fixation movements of eye</li> <li>Define accommodation reflex and pupillary light reflex</li> <li>Name the optic lesion associated with visual pathway</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 09, Page 190)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Sensory Physiology (Chapter 10,Page 374- 378)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 52, Page 657)</li> </ul>	1.  https://youtu.be/ev LyI35m8xU  2. https://teachmeanat omy.info/head/org ans/eye/extraocular -muscles/	1. C2 2. C2 3. C2 4. C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Sense of Taste and pathophysiology	<ul> <li>List the primary sensation of taste</li> <li>Explain the mechanism of taste perception and its transmission into central nervous system</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 11, Page 221)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition,Neurophysiology chapter 3, page 100</li> </ul>	https://youtu.be/K9     JSBzEEA0o  2.     https://youtu.be/m     Fm3yA1nslE  3. https://www.scienc     edirect.com/topics/	1. C1 2. C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,

		<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Sensory Physiology (Chapter 10,Page 361)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 54, Page 675-679)</li> </ul>	nursing-and- health- professions/taste			MST based Assessment) OSPE
Physiology of accommodation and clinical abnormalities	<ol> <li>Define accommodation reflex and pupillary light reflex</li> <li>Explain Clinical abnormalities associated with accommodation</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 09, Page 188)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 52, Page 660)</li> </ul>	https://youtu.be/xj     OblrAx3 s      https://teachmephy     siology.com/nervo     us-system/ocular-     physiology/ocular-     accommodation/	1. C1 2. C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Sense of Smell and pathophysiology	<ol> <li>List the primary sensation of smell</li> <li>Describe the stimulation of olfactory cells and its transmission into central nervous system</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 11, Page 217)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition,Neurophysiology chapter 3, page 98</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Sensory Physiology (Chapter 10,Page 358)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 54, Page 679)</li> </ul>	https://www.alime ntarium.org/en/fact -sheet/senses-smell     https://youtu.be/m Fm3yA1nslE	3. C1 4. C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

## **Biochemistry Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Lecture Students	Domain	Strategy	Tool
	Should Be Able To			

	Define receptors.	C1		MCQs,
Receptors and their	Classify Receptors	C2	LGIS	SAQs&
classification	-			Viva
	Explain the structure and function of G	C2		MCQs,
Signal transduction G	proteins		LGIS	SAQs &
proteins				Viva
Signal transduction	Describe different types of second	C2		MCQs,
Second messenger	messengers		LGIS	SAQs &
system				Viva
	Explain synthesis & functions of	C2		MCQs,
	neurotransmitters.			SAQs &
	Discuss related clinical disorders		LGIS	Viva
Neurotransmitters				
		C3		
	Explain the role of vitamin A in vision.	C2		MCQs,
Role of vitamin A in	Discuss related clinical abnormalities		LGIS	SAQs &
vision		C3		Viva

## **Anatomy Small Group Discussion (SGDs)**

Topics	At the end of lecture students should be able to:	Learning	Teaching	Assessment
	Define boundaries of Norma frontalis and verticalis.	<b>Domains</b> C1	Strategy	Tools
Facial & Superior	Define boundaries of Norma frontains and verticalis.     Enumerate their muscle attachment.	C1		MCQ
Aspect of Cranium (Norma Frontalis & Verticalis.)	Describe and features of its structure	C2	Skills	SAQ
	Correlate with the clinical conditions.	C2	Lab	VIVA
		C3		OSPE
	<ul> <li>understand provision of curative and preventive health care measures.</li> </ul>	CS		
	<ul> <li>Practice principles of bioethics</li> </ul>	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	<ul> <li>Describe bones forming the base of skull</li> <li>Explain the details of anterior, middle and posterior part of base of skull</li> </ul>			MCQ
External Surface of				
Cranial Base	Explain the attachments and relations of base of skull.	C2	Skills	SAQ
( Norma Basalis)	Fracture of cranial base		Lab	VIVA
	Head injuries and intracranial hemorrhage	C3		OSPE
	Correlate with the clinical conditions	C3		
	<ul> <li>understand provision of curative and preventive health care measures.</li> </ul>	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	• Enlist various bones in normal lateralis. Describe the cranial and facial subdivision. Define external acoustic meatus,	C1		
	Discuss attachments of mastoid and styloid process.	C2		
Lateral & Occipital	Explain the boundaries of Norma occipitalis.	C2	1	MCQ
Aspect of Cranium (Norma Lateralis.	Identify different foramina and structures passing through them at the base.		Skills Lab	SAQ VIVA
& Occipitalis)	Explain its attachments and relations.	C2		OSPE
	Correlate with the clinical conditions	C3	-	

	understand provision of curative and preventive health care	C3		
	<ul><li>measures.</li><li>Practice principles of bioethics</li></ul>	C3	-	
		C3	-	
	Apply strategic use of AI in health care    Dead releasest received		_	
	Read relevant research article	C3		
	Describe the anatomical features of mandible	C2	_	
	Describe parts of mandible	C2	Skills	MCQ
Mandible	Explain structural features of each part	C2	Lab	SAQ
	Enlist attachments of each part	C1		VIVA
	Describe blood and nerve supply of mandible.	C2		OSPE
	Interpret applied anatomy of mandible.	C3		
	Correlate with the clinical conditions	C3		
	understand provision of curative and preventive health care measures.	C3		
	Practice principles of bioethics	C3	1	
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Discuss the temporomandibular joint, its type, formation and neurovascular supply.	C2		
Tama anoman dibulan	Describe the movement's axis and muscles involved.	C2	Skills Lab	MCQ
Temporomandibular joint	Correlate clinically disorders of the temporo- mandibular joint.	C3		SAQ
(TMJ)	Correlate with the clinical conditions	C3		VIVA OSPE
	understand provision of curative and preventive health care measures.	C3		OSIL
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3	]	
	Read relevant research article	C3	]	
	Discuss limits of face.	C2		
	Tabulate the muscles of face. (Superficial and deep) origin, insertion, nerve supply and action.	C2		
Face	Discuss their role in facial expression.	C2	1	1.600
1 400	Describe facial nerve palsy upper and lower motor neuron.	C3		MCQ

	Discuss nerve supply of face.	C1	Skills	SAQ
	Discuss superficial and deep vasculature of face.	C1	Lab	VIVA
	Map the outline of facial artery and vein on simulated patient / model.			OSPE
	Correlate with the clinical conditions		1	
	<ul> <li>understand provision of curative and preventive health care measures.</li> </ul>	C3		
	Practice principles of bioethics	C3	-	
	Apply strategic use of AI in health care		-	
	Read relevant research article	C3	-	
	Explain the extent of scalp	C2		
	Describe the Scalp layers, nerves &vessels	C2	-	
Scalp and temple	Discuss the clinical correlates like scalp injuries and scalp wounds.	C3	Skills	MCQ
Scarp and temple	Correlate with the clinical conditions		Lab	SAQ VIVA
	<ul> <li>understand provision of curative and preventive health care measures.</li> </ul>	C3	-	OSPE
	Practice principles of bioethics			
	Apply strategic use of AI in health care			
	Read relevant research article	C3		
	Discuss its location, surfaces and borders	C2		
	Describe its muscular and ligamentous attachment.		1	
0.1%	Describe eyeball movements in relation to recti and oblique muscles.	C2	Skills Lab	MCQ SAQ
Orbit	Discuss role of levator palpebrae superioris	C2		VIVA
	Discuss clinical correlations of different coats of eyeball.	C2		OSPE
	Explain extent and subdivisions of pharynx	C2		
	Correlate with the clinical conditions	C3		
	<ul> <li>understand provision of curative and preventive health care measures.</li> </ul>	C3		
	Practice principles of bioethics	C3	]	
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Describe anatomy of eyeball with suspensory apparatus.	C2		

	Discuss different coats of eyeball with their nerve and blood	C2		MGO
Eyeball	supply.	C2	Cl-:11a	MCQ
Lycoun	<ul> <li>Discuss refractive media and compartments of eyeball.</li> <li>Correlate with the clinical conditions</li> </ul>	C2	Skills Lab	SAQ VIVA
		C3	Lab	OSPE
	<ul> <li>understand provision of curative and preventive health care measures.</li> </ul>	C3		OSPE
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Discuss the different components of lacrimal apparatus	C2		
	Describe the lacrimal gland and its neurovascular supply		Skills	MCQ
Eyelid	Correlate with the clinical conditions	C3	Lab	SAQ
& lacrimal app	understand provision of curative and preventive health care	C3		VIVA
	measures.			OSPE
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Describe boundaries of parotid region.	C2		
D (110 FF 1	Discuss surfaces, innervation and relations of parotid gland.	C2	Skills	MCQ
Parotid & Temporal	Understand the bio-physiological aspects of arches	C2	Lab	SAQ
Region	Map the outline of parotid gland and duct on simulated patient / model.	P+As		VIVA
	Correlate with the clinical conditions	C3		OSPE
	understand provision of curative and preventive health care	C3		
	measures.		_	
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3		
	Discuss the boundaries and contents of temporal region.	C2	_	
	Describe the temporalis muscle and its relations	C2		
	Enumerate the boundaries and contents of infratemporal region.	C1	Skills	MCQ
Infra temporal Fossa	Discuss muscles of mastication	C2	Lab	SAQ
OUL	Correlate with the clinical conditions	C3	_	VIVA
	understand provision of curative and preventive health care	C3		OSPE
	measures.		_	
	Practice principles of bioethics	C3	_	
	Apply strategic use of AI in health care	C3		

	Read relevant research article	C3		
	Discuss the boundaries and contents of pterygopalatine fossa.	C2		
	Discuss the communications of pterygopalatine fossa.	C2	1	MCQ
	Understand the bio-physiological aspects of arches		Skills	SAQ
Pterygopalatine Fossa	Correlate with the clinical conditions	C2 C3	Lab	VIVA
	understand provision of curative and preventive health care	C3	1	OSPE
	measures			
	Practice principles of bioethics	C3	1	
	Apply strategic use of AI in health care	C3	1	
	Read relevant research article	C3	-	
	Describe parts of the ear.	C2		
	<ul> <li>Discuss walls and contents of external and middle ear,</li> </ul>	C2	-	
	<ul> <li>Discuss their blood and nerve supply.</li> </ul>	C2	Skills	MCQ
External & Medal	<ul> <li>Explain pharynges tympanic tube, mastoid antrum and air cells.</li> </ul>	C2	Lab	SAQ
Ear	<ul> <li>Relation of chorda tympani and facial nerve.</li> </ul>	C1	-	VIVA
	Discuss Mastoiditis and tubal blockage     Correlate with the clinical conditions		-	OSPE
			-	
	understand provision of curative and preventive health care	C3	1	
	measures			
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care	C3		
	Read relevant research article	C3	1	
	Discuss membranous and bony labyrinth.	C2		
	Describe internal acoustic meatus.	C2	1	
Inner Ear	Explain the course of 7th and 8th cranial nerve in detail.	C2	Skills	MCQ
	Correlate with the clinical conditions	C3	Lab	SAQ
	understand provision of curative and preventive health care	C3	1	VIVA
	measures			OSPE
	Practice principles of bioethics	C3	1	
	Apply strategic use of AI in health care	C3	]	
	Read relevant research article	C3	]	
	Discuss anatomy and location of paranasal air sinuses separately.	C2		
	Define & list names of paranasal sinuses	C1	]	
	Describe their blood and nerve supply	C2		
	Describe functions of paranasal sinuses.	C2	1	

	Discuss drainage of paranasal sinuses.	C2		
Nose & Paranasal	Identify carious sinuses in radiographs	C1	Skills	MCQ
Sinuses	<ul> <li>Describe anatomy of external nose and features of nasal septum, side and anatomical position.</li> </ul>	C2	Lab	SAQ VIVA
	Describe details of olfactory receptors and formation of olfactory nerve.	C2		OSPE
	Discuss blood and nerve supply of external nose and nasal septum.	C2		
	<ul> <li>Explain functions of nose.</li> <li>Discuss in detail clinical correlates of external nose and nasal septum. Lateral nasal wall and their importance.</li> <li>Discuss on clinical importance of nasal cavity.</li> </ul>	C2		
		C2		
		C3		
	Correlate with the clinical conditions			
	<ul> <li>understand provision of curative and preventive health care measures</li> </ul>	C3		
	Practice principles of bioethics	C3		
	Apply strategic use of AI in health care			
	Read relevant research article	C3		
Cross Sectional	Identify the structures at	C3		
Anatomy	Sagittal section of head			
	• Level passing through the vestibule of the nose, the inferior nasal the temporomandibular joint, the pons and the occipital lobe of			
	the cerebrum.			

## **Physiology Small Group Discussion (SGDs)**

Topics Lea	arning Objectives	References		<b>Learning Resources</b>	Learning	Learning	Assessment
					<b>Domains</b>	Strategy	Tools
phys refra 2. Disc	plain the basic siology of eye and its active surfaces cuss the physical aciples of optics	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 09, Page 177,185)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition,Neurophysiology chapter 3, page 85</li> </ul>	1. 2.	https://www.britannica.co m/science/human-eye https://youtu.be/laEFdlxW OrA	1.C2 2. C2 3. C2 4.C2	SGD	MCQ SEQ VIVA VOCE

Physiology of Vision	<ul> <li>3. Describe the mechanism of accommodation and its control</li> <li>4. Describe the errors of refraction (Myopia, hyperopia, astigmatism and their correction by using different lens systems</li> </ul>	<ul> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.</li> <li>Sensory Physiology (Chapter 10,Page 374- 378)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition, Vision(Chapter 64,Page 1086) Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 50, Page 627-635)</li> </ul>				MCQ (LMS based Aseessment, MST based Assessment) OSPE
Physiology of Hearing	<ol> <li>Describe the physiology of hearing and function of tympanic membrane and ossicular system.</li> <li>Define impendence matching and attenuation reflex</li> <li>Explain the conduction of sound waves in the cochlea</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02,Vision (Chapter 10, Page 200,204)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition,Neurophysiology chapter 3, page 93</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Sensory Physiology (Chapter 10,Page 371-374) Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 53, Page 664,669)</li> </ul>	<ol> <li>https://youtu.be/Ie2j7GpC 4JU</li> <li>https://youtu.be/qgdqp- oPb1Q</li> <li>https://www.urmc.rochest er.edu/encyclopedia/conte nt.aspx?ContentTypeID=9 0&amp;ContentID=P02025</li> </ol>	1. C2 2. C1 3. C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Sense of Taste and Smell	<ol> <li>List the primary sensation of taste</li> <li>Explain the mechanism of taste perception and its transmission into central nervous system</li> <li>List the primary sensation of smell</li> <li>Describe the stimulation of olfactory cells and its transmission into central nervous system</li> </ol>	Physiology.25 <sup>TH</sup> Edition.Section	<ol> <li>https://youtu.be/K9JSBzE EA0o</li> <li>https://youtu.be/mFm3yA 1nslE</li> <li>https://www.sciencedirect. com/topics/nursing-and- health-professions/taste</li> <li>https://www.alimentarium. org/en/fact-sheet/senses- smell</li> <li>https://youtu.be/mFm3yA 1nslE</li> </ol>	1.C1 2.C2 3.C1 4.C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

(Chapter 54, Page 675-679) . (Chapter 54, Page 679)		

# **Biochemistry Small Group Discussion (SGDs)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Lecture Students Should Be Able	Domain	Strategy	Tool
	To			
	Explain different types of receptors and G proteins	C2		MCQs,
Receptors & G proteins			SGD	SAQs&
				Viva
	Discuss synthesis, functions & clinical significance of	C2		MCQs,
Neurotransmitters	neurotransmitters		SGD	SAQs &
				Viva

# **Anatomy Self Directed Learning (SDL)**

Topics	Learning objectives	Learning Resources	
	Define boundaries of Norma frontalis and verticalis.	Clinical Oriented Anatomy by Keith L.	
	Enumerate their muscle attachment.	Moore.6TH Edition. (Chapter 7, Page 823-	
Norma Frontalis and	Describe and features of its structure	8291).	
Verticalis.	Read relevant research article	• <a href="https://youtu.be/rr3-V7Qhf8E">https://youtu.be/rr3-V7Qhf8E</a>	
		• https://youtu.be/35Y71cRBqs8	
	Describe bones forming the base of skull	Clinical Oriented Anatomy by Keith L.	
	Explain the details of anterior, middle and posterior part of base of skull	Moore.6TH Edition. (Chapter 7, P829-836).	
	Identify different foramina and structures passing through them.	• <a href="https://youtu.be/6ZjJPLOJ0N8">https://youtu.be/6ZjJPLOJ0N8</a>	
External Surface of	Explain the attachments and relations of base of skull.	• <u>https://youtu.be/75lLaDFJTP4</u>	
Cranial Base Norma	Fracture of cranial base	• <a href="https://youtu.be/fteiKT_wQDE">https://youtu.be/fteiKT_wQDE</a>	
Basalis.	Head injuries and intracranial hemorrhage		
	Read relevant research article		
	• Enlist various bones in normal lateralis. Describe the cranial and facial subdivision.	Clinical Oriented Anatomy by Keith L.	
T . 100	Define external acoustic meatus,	Moore.6TH Edition. (Chapter 7, Page 827-	
Lateral & Occipital Aspect of Cranium	Discuss attachments of mastoid and styloid process.	829).	
Norma Lateralis.	Explain the boundaries of Norma occipitalis.	• <a href="https://youtu.be/tkpzPMXzwiM">https://youtu.be/tkpzPMXzwiM</a>	
Norma Occipitalis	Identify different foramina and structures passing through them at the base.	• <u>https://youtu.be/9Msvtw5CjFY</u>	
•	Explain its attachments and relations.		
	Read relevant research article		
	Define location of mandible	Clinical Oriented Anatomy by Keith L.	
	Describe parts of mandible	Moore.6TH Edition. (Chapter 7, Pae 827).	
Mandible	Explain structural features of each part	<a href="https://youtu.be/_1HosB-c_fQ">https://youtu.be/_1HosB-c_fQ</a>	
	Enlist attachments of each part	https://youtu.be/Qc0ysewMJg4	
	Describe blood and nerve supply of mandible.		

	Interpret applied anatomy of mandible.	
	Read relevant research article	
	• Discuss the temporomandibular joint, its type, formation, and neurovascular supply.	Clinical Oriented Anatomy by Keith L.
	Describe the movement's axis and muscles involved.	Moore.6TH Edition. (Chapter 7, Page 916-
Temporomandibular joint	Correlate clinically disorders of the temporo- mandibular joint.	920).
	Read relevant research article	• https://youtu.be/6tJsi5oghNY
	Read Televant Tesearch article	https://youtu.be/0BKU04QLzV0
	Discuss its location, surfaces and borders	- Clinical Orientad Anatomy by Voith I
	Discuss its location, surfaces and borders     Describe its muscular and ligamentous attachment.	Clinical Oriented Anatomy by Keith L.  Moore.6TH Edition. (Chapter 7, Page 889-
	Describe its muscular and figamentous attachment.     Describe eyeball movements in relation to recti and oblique muscles.	906).
	Describe eyeban movements in relation to recti and oblique muscles.      Discuss role of levator palpebrae superioris	https://youtu.be/HKEA4p5k66U
Orbit	Discuss role of levator parpeorae superioris     Discuss extraocular muscles of orbit.	https://youtu.be/Oz4kGGiJNrA
	Supporting apparatus of eyeball.	IIILIPS.// youtu.uc/OZ+KOOIJIVIA
	Nerves of eye ball	
	Vasculature of orbit	
	Read relevant research article	
	Describe boundaries of parotid region.	Clinical Oriented Anatomy by Keith L.
	Discuss surfaces, innervation and relations of parotid gland.	Moore.6TH Edition. (Chapter 7, Page 914-
Temporal Region	Understand the bio-physiological aspects of arches	916).
	Read relevant research article	https://youtu.be/HB6bN-rs2NU
	1	<ul> <li>https://youtu.be/zo7DDK-h1Mg</li> </ul>
	1	
	Discuss the boundaries and contents of temporal region.	Clinical Oriented Anatomy by Keith L.
	Describe the temporalis muscle and its relations	Moore.6TH Edition. (Chapter 7, Page 916-
Infra temporal Fossa	Enumerate the boundaries and contents of infratemporal region.	926).
	Discuss muscles of mastication	https://youtu.be/z2GlluoOtMY
	Read relevant research article	• https://youtu.be/ixCCX46XWHA
	Discuss the boundaries and contents of pterygopalatine fossa.	Clinical Oriented Anatomy by Keith L.
	Discuss the communications of pterygopalatine fossa.	Moore.6TH Edition. (Chapter 7, Page 951-
Diamera - Intina Engag	Understand the bio-physiological aspects of arches	954)
Pterygopalatine Fossa	Read relevant research article	https://youtu.be/9taW-Th3ycc
	<u> </u>	• <a href="https://youtu.be/o_JbDynMZjo">https://youtu.be/o_JbDynMZjo</a>

	<ul> <li>Describe parts of the ear.</li> </ul>	Clinical Oriented Anatomy by Keith L.
	<ul> <li>Discuss walls and contents of external and middle ear ,</li> </ul>	Moore.6TH Edition. (Chapter 7, Page 966-
External & Middle Ear	<ul> <li>Discuss their blood and nerve supply.</li> </ul>	973).
External & Middle Ear	<ul> <li>Explain pharyngo tympanic tube, mastoid antrum and air cells.</li> </ul>	• <u>https://youtu.be/VRLm7cpmZSk</u>
	<ul> <li>Relation of chorda tympani and facial nerve.</li> </ul>	https://youtu.be/unDpXRE_PPA
	<ul> <li>Discuss Mastoiditis and tubal blockage</li> </ul>	
	Read relevant research article	

# **Physiology Self Directed Learning (SDL)**

Topics Of SDL	Learning Objective	References	<b>Learning Resources</b>	Learning	Learning	Assessment
				Domains	Strategy	Tools
ON CAMPUS Introduction to Physiology of external ear, Middle ear	1.Describe physiology of external ear 2.Describe physiology of middle ear 3. Explain structure of middle ear	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02, (Chapter 10, Page 199)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition, Neurophysiology chapter 3, page 92</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.</li> <li>Sensory Physiology (Chapter 10, Page 364-371)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition Section 10. (Chapter 53, Page 663)</li> </ul>	<ol> <li>https://youtu.be/VRLm7 cpmZSk</li> <li>https://www.sciencedire ct.com/science/article/pii /S0378595522002192</li> </ol>	1. C2 2. C2 3. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Functions of Inner ear, Physiology of Hearing	1.Describe the physiology of hearing and function of tympanic membrane and ossicular system. 2.Define impendence matching and attenuation reflex	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition.Section 02, Vision (Chapter 10, Page 200,204)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup>         Edition, Neurophysiology chapter 3, page 93</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. Sensory Physiology (Chapter 10, Page 371-374)</li> </ul>	<ol> <li>https://youtu.be/Ie2j7Gp C4JU</li> <li>https://youtu.be/qgdqp- oPb1Q</li> <li>https://www.urmc.roche ster.edu/encyclopedia/co ntent.aspx?ContentTypeI</li> </ol>	1.C2 2.C1 3. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)

Hearing abnormalities, Tuning fork tests and audiometry	3. Explain the conduction of sound waves in the cochlea  1.Explain the auditory nervous pathway and abnormalities associated with it.  2. Describe the function of cerebral cortex in hearing.	<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 53, Page 664,669)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition(Chapter 62,Page 1067)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 53, Page 672)</li> </ul>	D=90&ContentID=P020 25  1. https://youtu.be/FgF91K 7dU8Y 2. https://youtu.be/acYMy9 b0F2A 3. https://www.uptodate.co m/contents/image?image Key=PC%2F58032⊤ icKey=PC%2F15359&s ource=see_link	1.C2 2. C2	SDL	OSPE SDL Evaluation MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
OFF CAMPUS Introduction to Physiology of Eye & Optics of vision. General Principles of optics, Physiological basis for errors of refraction	<ol> <li>Explain the basic physiology of eye and its refractive surfaces</li> <li>Discuss the physical principles of optics</li> <li>Describe the mechanism of accommodation and its control</li> <li>Describe the errors of refraction (Myopia, hyperopia, astigmatism and their correction by using different lens systems</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02, Vision (Chapter 09, Page 177,185)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition, Neurophysiology chapter 3, page 85</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.</li> <li>Sensory Physiology (Chapter 10, Page 374-378)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition, Vision(Chapter 64, Page 1086)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> Edition Section 10. (Chapter 50, Page 627-635)</li> </ul>	https://www.britannica.c om/science/human-eye https://youtu.be/laEFdlxW0r  A	1.C2 2. C2 3. C2 4.C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Fluid system of the eye Intraocular pressure, Function of the Structural Elements of the Retina	1.Describe the formation and circulation of aqueous humor     2.Explain the mechanism of regulation of intraocular pressure	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition.Section 02, Vision (Chapter 09, Page 178)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition, Vision(Chapter 64, Page 1094)</li> </ul>	<ul> <li>https://youtu.be/CKtLlO Sh8o4</li> <li>https://youtu.be/7CFY4g xLnMY</li> <li>https://my.clevelandclini c.org/health/body/24611</li> </ul>	1. C2 2. C2 3. C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,

	3.Define glaucoma and its treatment	• Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 10. (Chapter 50,	<u>-aqueous-humor-</u> vitreous-humor		MST based Assessment)
	troument	Page 635) (Chapter 51,Page 639)	Victoria Harror		OSPE
					SDL
					Evaluation
Photochemistry of vision &Physiological basis for photo transduction	<ol> <li>Describe the physiology of retinal layers</li> <li>Explain photochemistry of vision (rhodopsin - retinal)</li> <li>Describe the mechanism of activation of Rods</li> <li>Explain the photochemistry of color vision</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 02, Vision (Chapter 09, Page 182)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition, Neurophysiology chapter 3, page 87</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.Sensory Physiology (Chapter 10, Page 379-387)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 10. (Chapter 51, Page 641)</li> </ul>	3. <a href="https://www.brainkart.co">https://www.brainkart.co</a> <a href="mailto:m/article/Photochemistr">m/article/Photochemistr</a> <a href="mailto:y-of-Eye-Vision_19676/">y-of-Eye-Vision_19676/</a> <a href="https://youtu.be/k9lrM5i">https://youtu.be/k9lrM5i</a> <a href="mailto:pNuY">PNuY</a> <a href="mailto:u-of-eye-Vision_19676/">1. C2</a> <a href="mailto:co-decoration-red">2. C2</a> <a href="mailto:decoration-red">4. C2</a> <a href="mailto:pNuY">PNuY</a>	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation
Vestibular system	<ol> <li>Describe the function of the organ of corti</li> <li>Explain vestibular system</li> </ol>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition.Section 02, Vision (Chapter 10, Page 209)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup>         Edition, Neurophysiology chapter 3, page 95         Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition, (Chapter 63, Page 1072)</li> </ul>	4. <a href="https://www.physio-pedia.com/Vestibular_S">https://www.physio-pedia.com/Vestibular_S</a> <a href="https://www.physio-pedia.com/Pedia.c&lt;/td&gt;&lt;td&gt;SDL&lt;/td&gt;&lt;td&gt;MCQ&lt;br&gt;SEQ&lt;br&gt;VIVA VOCE&lt;br&gt;MCQ (LMS&lt;br&gt;based&lt;br&gt;Aseessment,&lt;br&gt;MST based&lt;br&gt;Assessment)&lt;br&gt;OSPE&lt;br&gt;SDL&lt;br&gt;Evaluation&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;Sense of Taste and pathophysiology&lt;/td&gt;&lt;td&gt;&lt;ol&gt;     &lt;li&gt;List the primary         sensation of taste&lt;/li&gt;     &lt;li&gt;Explain the mechanism         of taste perception and its         transmission into central         nervous system&lt;/li&gt; &lt;/ol&gt;&lt;/td&gt;&lt;td&gt;&lt;ul&gt;     &lt;li&gt;Ganong's Review of Medical Physiology.25&lt;sup&gt;TH&lt;/sup&gt;         Edition.Section 02, Vision (Chapter 11, Page 221)&lt;/li&gt;     &lt;li&gt;Physiology by Linda S. Costanzo 6&lt;sup&gt;th&lt;/sup&gt;         Edition, Neurophysiology chapter 3, page 100&lt;/li&gt; &lt;/ul&gt;&lt;/td&gt;&lt;td&gt;3. &lt;a href=" https:="" k9jsbz"="" youtu.be="">https://youtu.be/K9JSBz</a> 1.C1 2. C2 4. <a href="https://youtu.be/mFm3y">https://youtu.be/mFm3y</a> A1nslE	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,

	Human Physiology by Dee Unglaub Silver thorn. 8 <sup>TH</sup> Edition.Sensory Physiology (Chapter 10,Page 361)  Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 10. (Chapter 54, Page 675-679)	5. https://www.sciencedire ct.com/topics/nursing- and-health- professions/taste			MST based Assessment) OSPE SDL Evaluation
1. List the primary sensation of smell 2. Describe the stimulatio of olfactory cells and it transmission into centra nervous system  Sense of Smell and pathophysiology	Physiology by Linda S. Costanzo 6 <sup>th</sup>	<ul> <li>6. <a href="https://www.alimentarium.org/en/fact-sheet/senses-smell">https://www.alimentarium.org/en/fact-sheet/senses-smell</a></li> <li>7. <a href="https://youtu.be/mFm3y_A1nslE">https://youtu.be/mFm3y_A1nslE</a></li> </ul>	1.C1 2.C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE SDL Evaluation

# **Biochemistry Self Directed Learning (SDL)**

<b>Topics Of SDL</b>	Learning Objectives	Learning resources
	• Explain synthesis & functions of neurotransmitters	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 13, 21 page 166 &amp; 317 - 319)</li> <li>Use digital library</li> </ul>
Neurotransmitter	Discuss related clinical disorders	<ul> <li>https://www.khanacademy.org/science/biology/human-biology/neuron-nervous-system/a/neurotransmitters-their-receptors</li> <li>https://youtu.be/LOHKVp8hn7o</li> <li>https://scholar.google.com/scholar?hl=en&amp;as_sdt=0%2C5&amp;q=neurotransmitters&amp;oq=Neurotransmitter#:~:text=Axelrod%C2%A0%2D%20Scientific%20American%2C%201974%20%2D%20STOR</li> </ul>
D	Define receptors	Text book of Biochemistry Lehninger 8 <sup>th</sup> edition (Chapter 12, page 439- 440)
Receptors	Classify Receptors	<ul> <li>Use digital library</li> <li>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4817805/</li> <li>https://www.sinobiological.com/research/receptors/what-are-receptors#:~:text=Receptors%20are%20proteins%2C%20usually%20cell,cells%2C%20monocytes%20and%20stem%20cells.</li> <li>https://youtu.be/vjFes5I07c0</li> </ul>
G - Proteins	Explain the structure and function of G proteins	<ul> <li>Harper's Illustrated Biochemistry 32th edition (Chapter 42, page 503 – 505)</li> <li>Use digital library         <ul> <li>https://youtu.be/GHwMJnxaiys</li> </ul> </li> </ul> <li>https://www.britannica.com/science/G-protein-coupled-receptor</li> <li>https://www.nature.com/scitable/topicpage/gpcr-14047471/</li>

Role of Vitamin A in Vision	<ul> <li>Explain the role of vitamin A in vision</li> <li>Discuss related clinical abnormalities</li> </ul>	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 28, page 433-434)</li> <li>Use digital library</li> <li>https://www.bing.com/search?pglt=41&amp;q=role+of+vitamin+a +in+vision&amp;cvid=dddf1e33ab0a45318ddff31539f0445a&amp;aqs=edge.2.69i57j0l8.11403j0j1&amp;FORM=ANSPA1&amp;PC=U531#:~:text=https%3A//pubmed.ncbi.nlm.nih.gov/27830507</li> <li>https://www.bing.com/search?pglt=41&amp;q=role+of+vitamin+a +in+vision&amp;cvid=dddf1e33ab0a45318ddff31539f0445a&amp;aqs=edge.2.69i57j0l8.11403j0j1&amp;FORM=ANSPA1&amp;PC=U531#:~:text=Vision%20%E2%80%93%20Introduction%20to%20%E2%80%A6-,https%3A//mtsu.pressbooks.pub//8f%2Dvision%2Dvitamin s,-Web</li> <li>https://youtu.be/wo7i9bFs4Bw</li> </ul>
Second Messenger System	Describe different types of second messengers	<ul> <li>Lippincott Illustrated reviews of biochemistry 8<sup>th</sup> edition (Chapter 8, page 103- 105)</li> <li>Harper's Illustrated Biochemistry 32th edition (Chapter 42, page 506 – 509)</li> <li>Use digital library</li> <li><a href="https://www.britannica.com/">https://www.britannica.com/</a></li> <li><a href="https://youtu.be/PzA5Z3DXfrQ">https://youtu.be/PzA5Z3DXfrQ</a></li> </ul>

## **Histology Practicals Skill Laboratory (SKL)**

Topics	At the End of Demonstration Student Should Be	Learning	Teaching	Assessment
	Able To	<b>Domains</b>	Strategy	Tools
	Identify the histological slide cornea.  Historical slide cornea.	P C2		
Cornea	<ul> <li>Illustrate the microscopic picture of Cornea.</li> <li>Enlist two points of identification of each</li> <li>Read a relevant research article</li> </ul>	C1 C3	Skill Lab	OSPE

Retina	<ul> <li>Identify the histological slide of retina.</li> <li>Illustrate the microscopic picture of retina</li> <li>Enlist two points of identification</li> <li>Read a relevant research article</li> </ul>	P C2 C1 C3	Skill Lab	OSPE
Ear	<ul> <li>Identify the histological slide of ear</li> <li>Illustrate the microscopic picture of ear</li> <li>Enlist two points of identification of each</li> <li>Read a relevant research article</li> </ul>	P C2 C1 C3	Skill Lab	OSPE

# **Physiology Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives	Reference	Learning	Learning	Assessment
			Domains	Strategy	Tools
	Apparatus identification	Practical Notebook of Physiology First year	P		
	Principle	MBBS by Dr Saqib Sohail	C1		Viva Voce
Estimation of Visual	Procedure		P	Practicals/	Ospe
Acuity	Precautions		C1	skill lab	Video Assissted
	Recall normal value of visual acuity		C1		Assessment
	• Use of Snellen's chart & jaeger's chart		P		
	Recall the different Errors of refraction		C1		
	Apparatus identification	Practical Notebook of Physiology First year	P		
Examination of 8 <sup>th</sup>	Principle	MBBS by Dr Saqib Sohail	C1		Viva Voce
Cranial Nerve	Procedure		P	Practicals/	Ospe
(vestibular function)	Precautions		C1	skill lab	Video Assissted
	• Use various hearing tests & interpretation		C1		Assessment
	of their results		C1		
	• Recall deafness, its types & causes				
	Apparatus identification	Practical Notebook of Physiology First year	P		
Performance of	Principle	MBBS by Dr Saqib Sohail	C1		Viva Voce
Hearing Test (cochlear	Procedure		P	Practicals/	Ospe
function)	• Precautions		C1	skill lab	

Use various hearing tests & interpretation	C1	Video Assissted
of their results	C1	Assessment
• Recall deafness, its types & causes		

# **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives At The End Of Practical Students Should Be Able	Learning Domain	Teaching Strategy	Assessment Tool
	To			
Urine report	Write and interpret urine report	P	Skill Lab	OSPE
Lipid Profile	Write and interpret lipid profile	Р	Skill Lab	OSPE
Revision of Spectrophotometer	Understand principle and uses of spectrophotometer	Р	Skill Lab	OSPE

## **Basic and Clinical Sciences (Vertical Integration)**

#### Content

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

# **Case Based Learning Objectives (CBL)**

Subjects		Topics	At the end of the session the student should be able to	Learning
				<b>Domains</b>
Anatomy	•	Extra dural Haemorrhage (Norma lateralis & occipitalis)	Apply basic knowledge of subject to study clinical case.	C3
	•	Occulo Motor nerve palsy (Extra ocular muscles)	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	•	Night Blindness	Apply basic knowledge of subject to study clinical case.	C3

# Vertical Integration LGIS Pharmacology

Topic	At The End Of Lecture, Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
		Domain	Strategy	1 0018
	Recall the process of production and drainage of aqueous	C1		
Anti glaucoma drugs	humor		LGIS	MCQ
	Outline the range of normal IOP	C1		
	Enumerate main drug groups used in treatment of glaucoma	C1		
	Briefly discuss IOP lowering mechanism of main groups	C2		

#### Medicine

At The End Of Lecture, Students Should Be Able To:	Learning	Teaching	Assessment
	Domain	Strategy	Tools
• Discuss pathophysiology, signs and symptoms of patients with COVID-19.	C2		
• Discuss How will you investigate the patient with COVID-19.	C2	LGIS	MCQ
• Explain the management of COVID-19.	C2		
	<ul> <li>Discuss pathophysiology, signs and symptoms of patients with COVID-19.</li> <li>Discuss How will you investigate the patient with COVID-19.</li> </ul>	<ul> <li>Discuss pathophysiology, signs and symptoms of patients with COVID-19.</li> <li>Discuss How will you investigate the patient with COVID-19.</li> </ul>	<ul> <li>Domain Strategy</li> <li>Discuss pathophysiology, signs and symptoms of patients with COVID-19.</li> <li>Discuss How will you investigate the patient with COVID-19.</li> </ul>

# Sugery

Topic	At The End Of Lecture, Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
Plastic surgery	Introduction to Plastic Surgery	C2	LGIS	MCQ
Trastic surgery	Define Burn	C1	LGIS	Meg
To the state of th	Types of Burns	C2	1 010	1400
Burn	Classification of Burns		LGIS	MCQ
	Percentages of Burn			
D 14	Approach toward Burn patient?	C1	I GIG	MGO
Burn Managment	Physiological changes because of Burn      Liver to the Change of Florid Management in Leasure	C2	LGIS	MCQ
	<ul> <li>Importance of Fluid Management in burn</li> <li>Classify Foot Ulcer</li> </ul>	C1		
Foot Ulcer	Differentiate among Venous/Arterial /Traumatic and Diabetic Ulcer	C2	LGIS	MCQ
	Grading of Diabetic foot ulcers	C3		
	Classify Skin Ulcers	C1	LGIS	MCQ
Skin ulcer	Differentiate between marjolin ulcer, basal cell carcinoma and	C2	I GIG	MGO
	squamous cell carcinoma		LGIS	MCQ

#### **Peadiatrics**

Topic	At the End Of Lecture, Students Should Be Able To:	Learning	<b>Teaching</b>	Assessment
		Domain	Strategy	Tools
Preventive	Classify the degree of malnutrition in a malnourished child	C1	LGIS	MCQs
Pediatrics	Differentiate between clinical features of kwashiorkor and marasmus on a patient	C2	LGIS	MCQs

# Radiology

Topic	At The End Of Lecture, Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
General radiologic concepts	Categorize different tissues from most to least opaque on x-ray including bone, soft tissue, air, metal, and fat.	C2	LGIS	MCQs

### **ENT**

Topic	At The End Of Lecture, Students Should Be Able To:	Learning	Teaching	Assessmen
		Domain	Strategy	t Tools
	Know various cases of deafness	C1		
Deafness	• Understand the etiology, Pathology of various cases of deafness in	C2	LGIS	MCQs,
	external middle and internal ear and to know how to treat them.			
	Should define the turns	C1		
DNS & Rhinitis	Know various causes of DNS and Rhinitis	C1	LGIS	MCQs,
	Must be able to know treatment of all.	C1		
	Know definition of polyp	C1		
Nasal polyp	Know different types of nasal Polyps, their etiology, pathophysiology	C1	LGIS	MCQs,
	and treatment			
	Know latest management	C1		
Diseases of External	Know various diseases of external nose, their etiology	C1		
Nose	Pathophysiology and know how to treat them	C1	LGIS	MCQs,
	Know Various cases of ear discharge	C1		
	• Understand the etiology, Pathology of various cases of ear discharge in	C2		
Ear Discharge	external and middle ear.		LGIS	MCQs,
	Know how to treat these causes.	C1		
	Recognise signs and symptoms of acoustic neuroma.	C1		

Dizziness and Vertigo.	Identify treatment options and risks	C2	LGIS	MCQs,
	Classify facial fractures	C1		
Facial fractures	Enumerate treatment options for facial fractures	C2	LGIS	MCQs,
	Classify Sinusitis	C1		
Sinusitis	Enlist clinical features of sinusitis.	C2	LGIS	MCQs,
	Define deafness	C1		
Hearing Problems in	State the aetiology of hearing loss	C1		
Children	Elaborate the types of hearing loss	C1	LGIS	MCQs,
	Discuss the investigations of hearing loss	C2		
	Describe the treatment options for hearing loss patients.	C2		

# Eye

Topic	At The End Of Lecture, Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools	
	Refractive Errors	C1	2020083	2 0 0 2 5	
	• Types				
	Treatment				
	ColourVison		1 010	MCO	
Refractive Errors	• Types		LGIS	MCQs,	
	• Inheritence				
	Gender Predisposition				
	Night Blindness C1				
	• Etiology				
	Treatment				
	Glaucoma	C1		MCQs,	
	What is Glaucoma				
Glaucoma	Classification		LGIS		
	Treatment				
	Cataract	C1			
	Define		LGIS	MCQs,	

Cataract	Types of cataract			
	Surgical procedures			
	Ocular Trauma	C1		
	Blunt			
	<ul> <li>Penetrating</li> </ul>		]	
Ocular trauma &	Chemical Burns		LGIS	MCQs,
Ocular Procedures	Laceration			
	Ocular Procedures	C1		
	Cataract surgeries			
	Glaucoma Surgeries			
	<ul> <li>Laser And refractive Surgeries</li> </ul>			
	Corneal Ulcer	C1		
	Bacterial		LGIS	MCQs,
Cornea	• Viral			
	• Fungal			
	Define conjunctivitis	C1		
Conjunctivitis	Discuss the causes & types		LGIS	MCQs,
	Explain management in detail			

### **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

#### **Content**

- Longitudinal Themes
  - o The Holy Quran Translation
  - o Pak Studies/Islamiyat
  - o Family Medicine
  - o Behavioral Sciences
  - o Biomedical Ethics
  - o Early Clinical Exposure (ECE)

## **Family Medicine**

Topic	At the End of Lecture Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
	• Define earache.	C1		
	• Discuss various types of earache.	C2		
Approach to a patient	• Discuss the signs and symptoms of a patient with earache.	C2	LGIS	MCQs
with earache	• Discuss the workup for diagnosis of different types of	C2		
	earache.			
	• Discuss management of Various types of earache.			
	• Appreciate approach to a patient with earache.	C3		

#### **Biomedical Ethics & Professionalism**

Topics	At the end of session students should be able to:	Learning Domains	<b>Teaching Strategy</b>	Assessment Tools
Ethical dilemmas practice involving breach in principle of justice	<ul> <li>Analyze ethical dilemmas in healthcare practice involving breach in principle of justice.</li> <li>Explain what procedures adopted to maintain the principle of justice in challenging situations.</li> <li>Identify situations in which a doctor may have to take decisions in the best interests of the patient considering the principle of justice</li> </ul>	C3 C2 C1	Short video demonstration on violation of Ethical principle of beneficence and non-maleficence from suit CBEC Video resources Students' deliberations and reflections Reflective writing	<ul> <li>Assignment based assessment involving real life case scenarios under aggregate Marks.         (Internal Assessment)</li> <li>Assignment to be uploaded on LMS</li> </ul>

#### **Behavioural Sciences**

Topic	At The End Of Lecture, Students Should Be Able To:	Learning	Teaching	Assessment
		Domain	Strategy	Tools
Perception	<ul> <li>To be able to define perception and basic perceptual abilities.</li> <li>To identify abnormalities of perceptions and their role in disease causation</li> </ul>	C2	LGIS	MCQs,
Sleep and arousal	To be able to understand the physiology of sleep. Disorders of sleep and their management	C2	LGIS	MCQs,

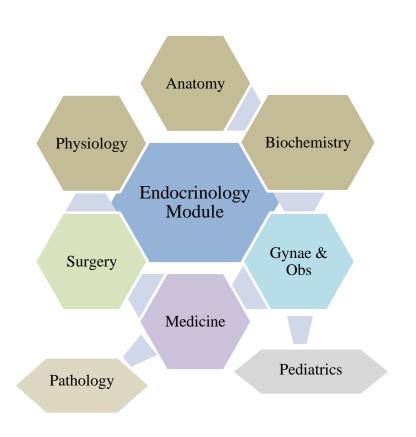


# Rawalpindi Medical University Department of Medical Education (DME)

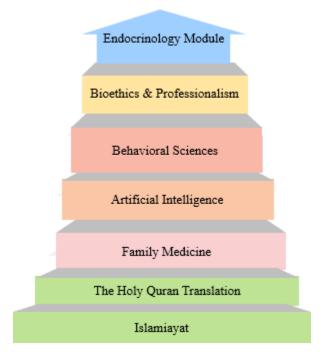
# **Endocrinology Module**



## **Integration of Disciplines in Endocrinology Module**



### **Spiral / General Education Cluster Courses**



# **Discipline Wise Details of Modular Contents**

Block	Subjects	Embryology	Histology	Histology Practical SKL. Lab.	Gross Anatomy	CBL SDL	
III	• Anatomy	gland  • Developmnt	parathyroid gland	<ul> <li>Pituitary         Gland</li> <li>Thyroid &amp;         parathyroid         gland</li> <li>Adrenal gland</li> <li>Pancreas</li> </ul>	<ul> <li>Bones of neck. Hyoid Bone &amp; Cervical vertebrae</li> <li>Fascias of Neck</li> <li>Superficial structurs of neck</li> <li>Lateral-cervical region (muscles &amp; triangles)</li> <li>Latera-cervical-region (neurovascular organization)</li> <li>Interior-cervical region (vessels of neck &amp; cervical plexus)</li> <li>Submandular region</li> <li>Soft palate</li> <li>Deep structures of neck</li> <li>Root of neck</li> <li>Thyroid&amp;Parathyroid gland</li> <li>Larynx</li> <li>Pharynx</li> <li>pancreas</li> </ul>	<ul> <li>Bones of neck</li> <li>SCM region &amp; superficial &amp; deep fascia</li> <li>lateral cervical region</li> <li>Anterior Triangle of neck &amp; its subdivisions</li> <li>Thyroid and para thyroid gland</li> <li>Online SDL Evaluation</li> <li>soft palate, larynx</li> </ul>	
	Physiology	and glucagon, Bloc	od glucose regula	ation, Role of Calciu	m & Phosphate	d hormones, Adrenal hormones, Insulin	
	Biochemistry	• Classification of hormones, Thyroid hormones, Adrenal hormones, Insulin and glucagon, Blood glucose regulation, Calcium revisit  Spiral Courses					
	The Holy Quran Translation	•					
	Islamiayat	•					
	Biomedical Ethics	History of Medical	Ethics				

Basics of Radiology
Dusies of Radiology
Approach to patient diabetes mellitus
Vertical Components
Growth problems due to Endocrine causes
Thyroid Disorders
Hypothyroidism and hyperthyroidism
Diabetes Mellitus
Endocrine Disorders in Pregnancy (Diabetes Mellitus, Thyroid Disorders)
Early Clinical Exposure (ECE)
Thyroid disorders
Hyperthyroidism
Hypothyroidism
Cushing Syndrome
Thyroid Nodule
Multi nodular Goiter
CA Thyroid
Graves Diseases
Blindness
Visual field defect
• Cataract
• Deafness
Hearing tests
Nasal Obstruction
Clinical Themes
crine causes

## **Endocrinology Module Team**

Module Name : Endocrinology Module

Duration of module : 04 Weeks

Focal Person Quran Translation

14. Focal Person Family Medicine

Lectures

Coordinator:Dr. Sidra HamidCo-coordinator:Dr. Aneela YasmeenReviewed by:Module Committee

Dr. Uzma Zafar

Dr. Sadia Khan

	<b>Module Committ</b>	ee		M	Iodule Task Force Team		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar	1.	Coordinator	Dr. Sidra Hamid (Assistant Professor of Physiology)		
2.	Director DME	Prof. Dr. Ifra Saeed	2.	DME Focal Person	Dr. Farzana Fatima		
3.	Chairperson Anatomy & Dean Basic	Prof. Dr. Ayesha Yousaf	3.	Co-coordinator	Dr. Sadia Baqir (Senior Demonstrator of Anatomy)		
	Sciences						
4.	Chairperson Physiology	Prof. Dr. Samia Sarwar	4.	Co-Coordinator	Dr. (Demonstrator of Biochemistry)		
5.	Chairperson Biochemistry	Dr. Aneela Jamil	5.	Co-coordinator	Dr. Aneela Yasmeen (Senior Demonstrator of Physiology)		
6.	Focal Person Anatomy Second Year	Dr. Maria Tasleem					
	MBBS						
7	Focal Person Physiology	Dr. Sidra Hamid	DME Implementation Team				
/ ·	1 ocal I cison I mysiology	Di. Sidia Hamia			-		
/.	1 ocal 1 cison 1 hysiology		1.	Director DME	Prof. Dr. Ifra Saeed		
8.	Focal Person Biochemistry	Dr. Aneela Jamil	1. 2.		-		
8.			1. 2. 3.	Director DME	Prof. Dr. Ifra Saeed		
	Focal Person Biochemistry	Dr. Aneela Jamil	1. 2. 3.	Director DME Assistant Director DME	Prof. Dr. Ifra Saeed Dr Farzana Fatima		
	Focal Person Biochemistry	Dr. Aneela Jamil Dr. Zunera Hakim	1. 2. 3.	Director DME Assistant Director DME DME Implementation Team	Prof. Dr. Ifra Saeed Dr Farzana Fatima Prof. Dr. Ifra Saeed		
	Focal Person Biochemistry Focal Person Pharmacology Focal Person Pathology	Dr. Aneela Jamil	1. 2. 3.	Director DME Assistant Director DME	Prof. Dr. Ifra Saeed Dr Farzana Fatima Prof. Dr. Ifra Saeed Dr. Farzana Fatima		
9.	Focal Person Biochemistry Focal Person Pharmacology	Dr. Aneela Jamil Dr. Zunera Hakim	1. 2. 3.	Director DME Assistant Director DME DME Implementation Team	Prof. Dr. Ifra Saeed Dr Farzana Fatima Prof. Dr. Ifra Saeed Dr. Farzana Fatima Dr. Saira Aijaz		

#### Module VI – Endocrinology Module

**Rationale:** The endocrine system is one of the two control systems of the body. It consists of many small organs responsible for the release of hormones. The endocrine system regulates metabolism, growth and development, tissue function and mood of a person. This system acts by means of hormones secreted into the blood to control process that require duration rather than speed e.g, metabolic activities and water and electrolyte balance. In this module we will concentrate on the integrating functions of the endocrine system and focus our teaching on the interaction of hormones and their integration to produce homeostatic regulation.

#### **Module Outcomes**

By the end of the module, students will be able to:

#### Knowledge

- The students should know the hormones and the organs producing them. They should know the chemical nature, biosynthesis and the physiological functions on their target organs. The student should understand & apply the concepts & principles of the basic sciences in context of clinical signs & symptoms to commonly occurring diseases of the endocrine.
- Used technology based Medical Education including
  - **Artificial Intelligence**
- Appreciate concept and importance of Family Medicine Biomedical Ethics & Professional Research

#### **Skills**

• Students should be able to recognize the histological features of all the endocrine glands under microscope.

#### **Attitude**

• Student should observe lab safety rules Should have professional Attitude

#### **Learning Objectives, Teaching Strategies & Assessments**

#### **Contents**

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry



# Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry) Anatomy Large Group Interactive Session (LGIS)

Topic	Learning Objectives At the end of lecture students should be able to	Learning Domain	Teaching strategy	Assessment Tool
Histology of pituitary gland and pineal gland	<ul> <li>Describe histological structure of pituitary and pineal gland</li> <li>Enumerate different cells present in both glands</li> <li>Discuss bio-physiological aspects related to their secretions</li> <li>Discuss the related clinical</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	C2 C1 C2 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SEQS</li><li>VIVA</li></ul>
Histology of thyroid and parathyroid glands	<ul> <li>Describe histological structure of thyroid and parathyroid gland</li> <li>Enumerate different cells present in both glands</li> <li>Discuss bio-physiological aspects related to their secretions</li> <li>Discuss the related clinical</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	C2 C1 C2 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SEQS</li><li>VIVA</li></ul>
Histology of adrenal gland	<ul> <li>Describe histological structure of adrenal gland.</li> <li>Enumerate different cells present in gland</li> <li>Discuss bio-physiological aspects related to secretions.</li> <li>Discuss the related clinical</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	C2 C1 C2 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SEQS</li><li>VIVA</li></ul>
Development of pituitary and pineal gland	<ul> <li>Describe stages of development of pituitary and pineal glands</li> <li>Enumerate structures involved in development of glands</li> <li>Discuss congenital abnormalities related to development of glands</li> <li>Read relevant research article</li> <li>Use digital library</li> </ul>	C2 C1 C3 C3 C3	LGIS	<ul><li>MCQS</li><li>SEQS</li><li>VIVA</li></ul>
Development of thyroid and	<ul> <li>Describe a stage of development of thyroid and parathyroid glands</li> <li>Enumerate structures involved in development of glands</li> <li>Discuss congenital abnormalities associated with their</li> </ul>	C2 C1 C3 C3	LGIS	<ul><li>MCQS</li><li>SEQS</li><li>VIVA</li></ul>

parathyroid	development	C3		
glands	<ul> <li>Read relevant research article</li> </ul>			
	Use digital library			
Development	Describe stages of development of adrenal glands	C2	LGIS	MCOS
of adrenal	• Enumerate structures involved in the development of gland.	C1	LOIS	• MCQS
	<ul> <li>Discuss congenital abnormalities associated with its</li> </ul>	C3		• SEQS
gland	development.	G2		• VIVA
	<ul> <li>Read relevant research article</li> </ul>	C3		
	Use digital library	C3		

# **Physiology Large Group Interactive Session (LGIS)**

Topic	At The End Of Lecture Students Should Be Able To	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Introduction to endocrinology & Signal transduction - I	<ul> <li>Define endocrinology</li> <li>Describe several types of chemical messenger systems</li> <li>Enumerate endocrine glands in the body along with their secretions</li> <li>Compare two major control systems of the body</li> <li>Identify different locations and properties of hormone receptors</li> <li>Explain various intracellular signaling pathways after hormone receptor activation</li> <li>Describe various mechanism of actions of hormones in detail</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 16, Page 299)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 395)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 07,Page 231) (Chapter 23,Page 765)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 50,Page 817)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 75, Page 915-928)</li> </ul>	<ul> <li>https://youtu.be/Q         LcxQT1fb_c</li> <li>https://www.khana         cademy.org/scienc         e/ap-biology/cell-         communication-         and-cell-cycle/cell-         communication/a/i         ntroduction-to-         cell-signaling</li> <li>https://youtu.be/G         HwMJnxaiys</li> </ul>	1. C1 2. C1 3. C1 4. C2 5.C1 6.C2 7.C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Hypothalamic— pituitary axis & GH	<ul> <li>Recall the physiological anatomy and parts of pituitary gland</li> <li>Enumerate various cell types in pituitary gland along with their secretion and</li> </ul>	• Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 03 (Chapter 17, Page 307,313,324)	<ul> <li>https://www.mdpi.</li> <li>com/2072-</li> <li>6694/15/15/3820</li> </ul>	C1 C1 C2	LGIS	MCQ SEQ VIVA

	<ul> <li>function</li> <li>Explain connections of anterior and posterior pituitary gland with hypothalamus</li> <li>Enlist various hormones secreted from anterior &amp; posterior pituitary gland</li> <li>Describe metabolic functions of growth hormone</li> <li>Elaborate the role of growth hormone in soft tissue and bone growth</li> <li>Discuss role of somatomedins in relation with growth hormone</li> <li>Explain regulation of secretion</li> </ul>	<ul> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 407,411)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 07,Page 241) (Chapter 23,Page 775)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 51,Page 837)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 76, Page 929)</li> </ul>	<ul> <li>https://youtu.be/fq z4WOwfz4Q</li> <li>https://resources.w fsahq.org/atotw/th e-hypothalamic- pituitary-axis-part- 1-anatomy- physiology/</li> </ul>	C1 C1 C2 C2 C2		VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Introduction to endocrinology & Signal transduction- II	<ul> <li>Classify hormones according to solubility and chemical nature</li> <li>Describe the nature&amp; synthesis of hormones</li> <li>Differentiate different classes of hormones</li> <li>Describe the secretion, transport, feedback control&amp; clearance of hormones</li> <li>Differentiate different classes of hormones</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 16, Page 301,304)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 395)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 07,Page 235,250)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 50,Page 817-831)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 75, Page 915-928)</li> </ul>	<ul> <li>https://youtu.be/Q         LcxQT1fb_c</li> <li>https://www.khana         cademy.org/scienc         e/ap-biology/cell-         communication-         and-cell-cycle/cell-         communication/a/i         ntroduction-to-         cell-signaling</li> <li>https://youtu.be/G         HwMJnxaiys</li> </ul>	C2 C1 C2 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Abnormalities of growth hormone	<ul> <li>Enlist abnormalities of GH secretion</li> <li>Describe pan hypopituitarism</li> <li>Discuss in detail dwarfism &amp; its treatment</li> <li>Explain gigantism &amp; acromegaly</li> <li>Differentiate gigantism &amp; acromegaly</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 18, Page 321-334)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup></li> </ul>	<ol> <li>https://youtu.be/0 GuRf5YPGiA</li> <li>https://www.ncbi.n lm.nih.gov/books/ NBK278971/</li> </ol>	C1 C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE

secretion		<ul> <li>Edition.Endocrine Physiology (chapter 09, page 412)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 23,Page 775)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 76, Page 936)</li> </ul>		C2		MCQ (LMS based Aseessment, MST based Assessment) OSPE
Insulin and glucagon:  Structure and metabolic functions	<ul> <li>Describe physiological anatomy of pancreas</li> <li>Describe chemistry, synthesis and transport of insulin</li> <li>Describe the factors which affect secretion of insulin</li> <li>Discuss mechanism of action of insulin</li> <li>Describe the physiological actions of insulin</li> <li>Explain mechanism of insulin secretion</li> <li>Describe mechanism of action of glucagon</li> <li>Discuss regulation of secretion of glucagon</li> <li>Explain the functions of glucagon</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 24, Page 429,445)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 440,446)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 22,Page 743)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 56,Page 902)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 79, Page 973,982)</li> </ul>	1. https://youtu.be/1c6a0 BNsyek 2. https://www.britannica .com/science/insulin 3. https://www.medicaln ewstoday.com/articles/ 316427#overview	C1 C1 C1 C2 C1 C2 C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Hormones of posterior pituitary gland (oxytocin and ADH)	<ul> <li>Recall site of synthesis and secretion of posterior pituitary hormones</li> <li>Describe mechanism of action, stimuli for secretion, functions and regulation of ADH</li> <li>Discuss functions of oxytocin</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 17, Page 311)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 415)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 07,Page 241)</li> </ul>	1.  https://youtu.be/E Gl1Oeetxpg  2. https://teachmephy siology.com/endoc rine- system/hypothala mus- pituitary/posterior- pituitary/posterior-	C1 C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment)

Regulation of blood Glucose & Diabetes mellitus	<ul> <li>Describe various factors regulating blood glucose concentration</li> <li>Discuss the importance of blood glucose regulation</li> <li>Discuss the pathophysiology of diabetes mellitus</li> <li>Explain the physiology of diagnosis of diabetes mellitus</li> <li>Explain the treatment of diabetes mellitus</li> <li>Differentiate between type I &amp; type II diabetes mellitus</li> <li>Differentiate between diabetes mellitus &amp; diabetes insipidus</li> </ul>	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 51,Page 849)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 76, Page 938)</li> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 24, Page 435-438,446-448)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 445)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 22,Page 743)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 56,Page 915)</li> </ul>	pituitary-gland/ 3. https://www.scienc edirect.com/topics/ agricultural-and- biological- sciences/posterior- pituitary-hormones  1.  https://youtu.be/K Y85BUcQZew 2. https://www.phar maguideline.com/ 2022/01/hormona l-regulation-of- blood-glucose- level.html 3. https://www.medi calnewstoday.co m/articles/316427	C1 C2 C2 C2 C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based
		<ul> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 79, Page 983)</li> </ul>				Assessment) OSPE
	Describe physiological anatomy of adrenal	Ganong's Review of Medical	1. <a href="https://youtube/2-">https://youtube/2-</a>	C1		MCQ
Aldosterone and cortisol	gland	Physiology.25 <sup>TH</sup> Edition.Section 03	Z3Q6BZuBY	C1	1.010	SEQ
	<ul><li>Enumerate its various hormones</li><li>Describe synthesis, transport &amp; metabolism</li></ul>	(Chapter 20, Page 351-364)	2. <a href="https://journals.ph">https://journals.ph</a>	C1	LGIS	VIVA
	of adrenocortical hormones	Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition, Endocrina Physiology	ysiology.org/doi/a	C1		VOCE
	<ul> <li>Describe mechanism, physiological actions of aldosterone</li> <li>Explain the phenomenon of aldosterone</li> </ul>	Edition. Endocrine Physiology (chapter 09, page 427)	<u>bs/10.1152/ajplega</u> cy.1964.207.1.109	C2 C1		MCQ (LMS based
		<ul> <li>Human Physiology by Dee Unglaub</li> </ul>	3. <u>https://www.britan</u>	C1		Aseessment,
		Silver thorn. 8 <sup>TH</sup> Edition.(Chapter	nica.com/science/a	C1 C2		MST based
	<ul><li>escape</li><li>Describe regulation of aldosterone</li></ul>	23,Page 765)	ldosterone	C2		Assessment)
	secretion	<ul> <li>Physiological Basis of Medical</li> </ul>	10000010110	C1		OSPE

	<ul> <li>Enlist abnormalities of aldosterone secretion</li> <li>Describe mechanism, physiological actions of cortisol</li> <li>Discuss anti stress and anti-inflammatory actions of cortisol</li> <li>Describe regulation of cortisol secretion</li> <li>Discuss functions of adrenal androgens</li> <li>Describe the chemistry, secretion regulation of secretion of ACTH</li> <li>Discuss the actions of ACTH</li> </ul>	Practice by Best & Taylor's.13 <sup>th</sup> Edition. Section 07(Chapter 53,Page 866)  • Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 14. (Chapter 78,Page 955)		C2 C1 C2		
Thyroid hormone: Production, storage and release	<ul> <li>Recall physiological anatomy of thyroid gland</li> <li>Briefly explain secretions of thyroid gland</li> <li>Compare the features of tri iodothyronine with thyroxine</li> <li>Describe the steps of synthesis of thyroid hormone</li> <li>Discuss in detail half-life, release, and transport of thyroid hormones</li> <li>Explain regulation of secretion of thyroid hormone</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 19, Page 337)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 419)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 23,Page 770)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 52,Page 855)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 77, Page 941)</li> </ul>	1.  https://youtu.be/af VX3mlNB80  2. https://www.scienc edirect.com/topics/ biochemistry- genetics-and- molecular- biology/thyroid- hormone-release  3. https://byjus.com/b iology/thyroid- hormone/	C1 C2 C2 C1 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
	<ul> <li>Discuss in detail Cushing's syndrome</li> <li>Differentiate between Cushing disease and Cushing's syndrome</li> </ul>	• Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 03 (Chapter 20, Page 364-373)	1. <a href="https://journals.ph">https://journals.ph</a> <a href="ysiology.org/doi/a">ysiology.org/doi/a</a>	C2 C2 C2		
	<ul> <li>Discuss adrenogenital syndrome</li> <li>Discuss the physiological anatomy of adrenal medulla</li> <li>Enumerate various hormones secreted by adrenal medulla</li> </ul>	<ul> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 431,434,437)</li> <li>Human Physiology by Dee Unglaub</li> </ul>	bs/10.1152/ajplega cy.1964.207.1.109 2. https://youtu.be/pS eU9Ei-3u4	C2 C1 C1 C2	LGIS	MCQ SEQ VIVA VOCE

Abnormalities of adrenocortical hormone	<ul> <li>Describe the steps involved in synthesis of catecholamines</li> <li>Explain the function of catecholamines</li> <li>Discuss stress response</li> <li>Describe pheochromocytoma</li> </ul>	Silver thorn. 8 <sup>TH</sup> Edition.(Chapter 23,Page 765)  • Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition. Section 07(Chapter 53,Page 874,875)  • Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 14. (Chapter 78, Page 969)	3. <a href="https://medlineplus.gov/adrenalglandd">https://medlineplus.gov/adrenalglandd</a> <a href="isorders.html">isorders.html</a>	C2 C1		MCQ (LMS based Aseessment, MST based Assessment) OSPE
Physiological role of thyroid hormone	<ul> <li>Describe mechanism of action of thyroid hormone</li> <li>Explain physiological functions of thyroid hormone</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 19, Page 343,345)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 423)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 23,Page 770)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 52,Page 855)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 77, Page 944)</li> </ul>	<ol> <li>https://www.scienc edirect.com/topics/ biochemistry- genetics-and- molecular- biology/thyroid- hormone-release</li> <li>https://youtu.be/IX jRsX50JB4</li> <li>https://journals.ph ysiology.org/doi/fu ll/10.1152/physrev .2001.81.3.1097</li> </ol>	C1 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Calcium homeostasis (Vitamin D, parathyroid hormone	<ul> <li>Discuss normal levels and metabolism of calcium and phosphate</li> <li>Describe the effects of hypocalcemia &amp; hypercalcemia</li> <li>Explain the absorption and excretion of calcium and phosphate</li> <li>Discuss in detail bone physiology</li> <li>Describe the steps involved the activation of Vitamin D</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 21, Page 375-386)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 448)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter</li> </ul>	<ol> <li>https://youtu.be/JY         QL7JEsF_4</li> <li>https://teachmephy         siology.com/bioch         emistry/electrolyte         s/calcium-</li> </ol>	C2 C1 C2 C2 C1 C2 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS

and calcitonin)	<ul> <li>Discuss the actions of vitamin D</li> <li>Describe the physiological anatomy of parathyroid glands</li> <li>Describe the chemistry &amp; regulation of secretion of parathyroid hormone</li> <li>Explain the actions of parathyroid hormones</li> <li>Describe functions and regulation of</li> </ul>	<ul> <li>23,Page 777,779)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 54,Page 881,890)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection</li> </ul>	regulation	C2 C1		based Aseessment, MST based Assessment) OSPE
Abnormalities of thyroid hormone (Goiter, hypothyroidism and hyperthyroidism)	<ul> <li>Describe functions and regulation of calcitonin</li> <li>Enlist disorders of thyroid gland</li> <li>Discuss in detail causes, symptoms, diagnosis and treatment of hyperthyroidism</li> <li>Discuss in detail causes, symptoms, diagnosis and treatment of hypothyroidism</li> <li>Compare hypothyroidism with hyperthyroidism</li> <li>Differentiate between pituitary dwarfism and cretinism</li> </ul>	<ul> <li>14. (Chapter 80, Page 991)</li> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 19, Page 344,345)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 425)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 23,Page 773)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 52,Page 861)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 77, Page 950)</li> </ul>	1. <a href="https://www.hopkinsmedicine.org/he">https://www.hopkinsmedicine.org/he</a> <a href="https://www.hopkinsmedicine.org/he">alth/conditions-and-diseases/disorders-of-the-thyroid</a> 2. <a href="https://youtu.be/0vnpmaSI57c">https://youtu.be/0vnpmaSI57c</a>	C1 C2 C2 C2 C2 C2	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Bone pathophysiology (rickets, osteomalacia, osteoporosis, hypo and	<ul> <li>Discuss in detail hypoparathyroidism</li> <li>Describe hyperparathyroidism</li> <li>Describe osteoporosis</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 21, Page 378,380,381,385,387)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 453)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter</li> </ul>	<ol> <li>https://www.ortho bullets.com/basic- science/9031/ricke</li> <li>ts</li> <li>https://youtu.be/Sr m2GH1dusg</li> <li>https://www.webm d.com/osteoporosi s/what-is-</li> </ol>	C2 C1 C1	LGIS	MCQ SEQ VIVA VOCE MCQ (LMS based

hyperparathyroidism)	23,Page 779)	<u>osteomalacia</u>	Aseessment,
	<ul> <li>Physiological Basis of Medical</li> </ul>		MST based
	Practice by Best & Taylor's.13 <sup>th</sup>		Assessment)
	Edition. Section 07(Chapter 54, Page		OSPE
	881,890)		
	<ul> <li>Textbook of Medical Physiology by</li> </ul>		
	Guyton & Hall.14 <sup>th</sup> EditionSection		
	14. (Chapter 80, Page 1003,1006)		

# **Biochemistry Large Group Interactive Session (LGIS)**

Topic	Learning Objectives	Learning	Teaching	Assessment
	At The End Of Lecture Students Should Be Able To	Domain	Strategy	Tool
	Classify hormones	C2		
Classification and	Explain the mechanism of action of hormones	C2	LGIS	MCQs,
mechanism of action of				SAQs &
hormones				Viva
		C2		
				MCQs,
Thymoxin	Describe nature, formation and mechanism of action of thyroxin Discuss related clinical disorders		LGIS	SAQs &
Thyroxin	Discuss related clinical disorders	C3		Viva
		C2		
Parathyroid and	Discuss role of various hormones acting on calcium and phosphate metabolism		LGIS	MCQs,
Calcitonin	Discuss related clinical disorders			SAQs &
	Discuss related entired disorders	C3		Viva
	Describe synthesis, mechanism of action and functions of	C2		MCQs,
Adrenal cortical	aldosterone, cortisol and adrenal androgens		LGIS	SAQs &
hormones	Discuss related clinical disorders	C3		Viva
Adrenal medullary	Describe mechanism of action and role of adrenal medullary	C2		
hormones	hormones			MCQs,
Hormones	Discuss related diseases		LGIS	SAQs &

		C3		Viva
Insulin and glucagon	Explain formation, mechanism of action and role of insulin and glucagon Discuss related diseases	C2 C3	LGIS	MCQs, SAQs & Viva
Blood glucose regulation	Describe regulation of normal plasma glucose level Explain hypoglycemia	C2 C3	LGIS	MCQs, SAQs & Viva

# **Anatomy Small Group Discussion (SGDs)**

Topic	Learning Objectives At the end of lecture students should be able to	Learning	Teaching	Assessment
	Describe the borders and surfaces of body and the two cornuas of hyoid bone.	Domain C2	Strategy	Tool
Bones of neck	, and the state of			
	Discuss the attachments on the hyoid bone.      Discuss the attachments of the hyoid bone.	C2		
Hyoid Bone	Discuss the related applied of hyoid.      Describe and the formula of a grain lateral formula of the standard formula of	C2 C2	Skill lab	MCQS
Cervical vertebrae	Describe anatomical features of cervical typical & atypical vertebrae.      Discrept the interpretable limits & recognized and in the feature features.			SEQS
	• Discuss the intervertebral joints& movements of cervical region of vertebral column.	C2		VIVA OSPE
	• Discuss the anatomical basis of cervical pain & injuries of cervical vertebral column	C2		
	Read relevant research article	C3		
	• Use digital library.	C3		
	• Understand cervical subcutaneous tissue & platysma.	C2		
	• Discuss the deep cervical fascia and the formation of layers due to its condensation.	C2	Skill lab	
	• Discuss the attachments and special features of the investing layer.	C2		MCQS SEQS VIVA
	• Describe the attachments and special features of prevertebral fascia.	C2		
Fascias of Neck.	• Describe the attachments and special features of pretracheal fascia.	C2		
	• Discuss the carotid sheath formation, contents and relations.	C2		
	• Differentiate between the buccopharyngeal fascia and pharyngobasilar fascia.	C2		
	Discuss related clinicals     C3			OSPE
	Read relevant research article			
	• Use digital library.	C3		1
	• Discuss the location, attachments & actions of SCM & trapezius.	C2		
	• Describe boundaries & location of posterior cervical region .	C2		
Superficial	• Discuss suboccipital triangle of neck & its contents.	C2	Skill lab	MCOC
structures of the neck	Discuss related clinicals	C3	SKIII Iau	MCQS SEQS
	• Discuss the location, attachments & actions of SCM & trapezius .	C2		VIVA
	• Describe boundaries & location of posterior cervical region .		_	OSPE
	Discuss related clinicals			
	Read relevant research article	C2 C3		
	• Use digital library.	C3		
lateral cervical	Describe boundaries of posterior triangle.	C2	Skill lab	MCQS

region-(Muscles & triangles)	• Discuss the muscles in lateral cervical region.( splenius capitus ,levator scapulae ,middle scalene &posterior scalene.			SEQS VIVA
urumgres)	Describe boundaries and contents of occipital triangle	C2	1	OSPE
	Discuss boundaries and contents of subclavian triangle	C2	1	
	Discuss related clinicals	C3	1	
	Read relevant research article	C3		
	• Use digital library.	C3		
	• Discuss arteries in lateral cervical region (supra scapular artery, 3rd part of subclavian artery,	C2		
lateral cervical	• Discuss veins of lateral cervical region (EJV&subclavian vein )	C2	1	
region-(Neuro	Discuss nerve supply of lateral cervical region	C2	1	MCQS
vascular	Discuss lymphatic drainage in lateral cervical region.	C2	Skill lab	SEQS
organization)	Discuss related clinicals	C3	1	VIVA OSPE
	Read relevant research article	C3	1	OSFE
	Use digital library	C3	1	
Anterior cervical	• Discuss the Muscles in anterior cervical region (suprahyoid muscle group & infrahyoid muscle group)	C2		
region-(Muscles)	Discuss the anatomical basis of torticollis	C3	Skill lab	MCQS SEQS VIVA OSPE
	Discuss related clinicals.	C3	1	
	Read relevant research article	C3		
	Use digital library	C3		OSPE
	• Discuss arterial supply in anterior cervical region (carotid system of arteries )	C2		
Anterior Cervical	Discuss venous drainage in anterior cervical region	C2		1.500
Region-(Vessels of	Discuss formation of cervical plexus	C2	Skill lab	MCQS
neck & Cervical	Enumerate branches of cervical plexus	C2		SEQS VIVA
plexus)	Discuss area of distribution	C2		OSPE
	Describe clinical and applied anatomy	C3		OBLE
	Read relevant research article	C3		
	Use digital library	C3		
	Discuss the relations of digastric, mylohyoid and hyoglossus muscles.	C2		
Submandibular	Describe the gross features, relations, blood supply, lymphatic drainage and nerve	C2		MCCC
Region	supply of submandibular salivary gland.		Skill lab	MCQS
	• Describe the details of Wharton's duct, its opening and related clinicopathological conditions	C2		SEQS VIVA
	• Describe the gross features, relations, blood supply, lymphatic drainage and nerve	C2		OSPE

	supply of sublingual salivary gland.			
	• Tabulate the comparison of three salivary glands.	C2		
	• Describe the connections and branches with area of supply by the sub-mandibular	C2		
	ganglion.			
	Read relevant research article	C3		
	• Use digital library	C3		
	• Discuss the anatomy of soft palate along with attachment of muscles and their	C2		
	actions.			1.000
Soft Palate	• Describe boundaries of tonsillar fossa.	C2		MCQS
	Discuss related clinicals	C3	Skill lab	SEQS
	• Read relevant research article	C3		VIVA OSPE
	• Use digital library	C3		OSPE
	• Discuss prevertebral muscles (ant.vertebral muscles & lateral vertebral muscles)	C2		
Deep structures of	Discuss related clinicals.	C3	Skill lab	MCQS SEQS
neck	Read relevant research article	C3		
	Use digital library	C3		VIVA OSPE
	• Discuss arteries & veins in root of neck.	C2		0.212
	• Discuss nerve supply in root of neck.	C2		
	Discuss related clinicals.	C3		MCQS SEQS
Root of Neck	Read a relevant research article	C3	Skill lab	
	Use digital library	C3		VIVA OSPE
	Discuss anatomy & functions of thyroid & parathyroid gland	C2		0.212
	Discuss blood supply of thyroid gland	C2		
Thyroid and para	Discuss lymphatic drainage & nerve supply of thyroid gland	C2		MCOG
thyroid glands	Discuss related clinicals.	C3		MCQS
	Read a relevant research article	C3	Skill lab	SEQS VIVA
	Use digital library	C3		OSPE
larynx	• Discuss larynx in detail with its cartilages and muscles.	C2		
iai y ii x	Discuss blood supply of larynx	C2	1	
	Discuss functions of larynx	C2		MCQS
	Discuss functions of farying     Discuss trachea (revisit).	C2	Skill lab	SEQS
	Discuss related clinicals	C3		
	Read a relevant research article	C3	-	OSPE
	- Read a relevant research article			

	• Use digital library	C3		
	• Tabulate muscles of pharynx with origin, insertion, nerve supply and actions	C2		
	Discuss nerve supply of Pharynx	C2	=	
	Discuss blood supply of larynx	C2		MCQS
Pharynx	• Discuss esophagus (revisit)	C2	Skill lab	SEQS
1 1101 ) 1111	Discuss related clinicals	C3		VIVA
	Read a relevant research article	C3		OSPE
	• Use digital library	C3		
	Describe location of pancreas & Adrenal gland	C2		
	• Enlist different parts of pancreas	C2		
	Describe relations of pancreas	C2		14000
Pancreas & Adrenal	• Discuss blood supply of pancreas	C2	G1 '11 1 1	MCQS
gland	Discuss the clinical Anatomy of pancreas	C3	Skill lab	SEQS VIVA
	Discuss related clinicals	C3		OSPE
	Read a relevant research article	C3		OSIL
	• Use digital library	C3	1	

# **Physiology Small Group Discussion (SGDs)**

Topic	At The End Of Lecture Students Should Be Able To	References	Learning Resources	Learning Domains	Learning Strategy	Assessment Tools
Signal transduction & Growth hormone.	<ul> <li>Define endocrinology</li> <li>Describe several types of chemical messenger systems</li> <li>Enumerate endocrine glands in the body along with their secretions</li> <li>Compare two major control systems of the body</li> <li>Identify different locations and properties of hormone receptors</li> <li>Explain various intracellular signaling pathways after hormone receptor activation</li> <li>Describe various mechanism of</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 16, Page 299)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 395)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 07,Page 231) (Chapter 23,Page 765)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter</li> </ul>	<ul> <li>https://youtu.be/QLcxQ T1fb_c</li> <li>https://www.khanacade my.org/science/ap- biology/cell- communication-and- cell-cycle/cell- communication/a/intro duction-to-cell- signaling https://youtu.be/GHwM Jnxaiys</li> </ul>	1. C1 2. C1 3. C1 4. C2 5.C1 6.C2 7.C1	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

	actions of hormones in detail	<ul> <li>50,Page 817)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 75, Page 915-928)</li> </ul>				
Thyroid Hormones	<ul> <li>Recall physiological anatomy of thyroid gland</li> <li>Briefly explain secretions of thyroid gland</li> <li>Compare the features of tri iodothyronine with thyroxine</li> <li>Describe the steps of synthesis of thyroid hormone</li> <li>Discuss in detail half-life, release, and transport of thyroid hormones</li> <li>Explain regulation of secretion of thyroid hormone</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 19, Page 337)</li> <li>Physiology by Linda S.         <ul> <li>Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 419)</li> </ul> </li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 23,Page 770)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 52,Page 855)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 77, Page 941)</li> </ul>	1.  https://youtu.be/afV X3mlNB80  2. https://www.scienc edirect.com/topics/ biochemistry- genetics-and- molecular- biology/thyroid- hormone-release  3. https://byjus.com/bi ology/thyroid- hormone/	C1 C2 C2 C1 C2 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Insulin and Glucose Metabolism	<ul> <li>Describe physiological anatomy of pancreas</li> <li>Describe chemistry, synthesis and transport of insulin</li> <li>Describe the factors which affect secretion of insulin</li> <li>Discuss mechanism of action of insulin</li> <li>Describe the physiological actions of insulin</li> <li>Explain mechanism of insulin secretion</li> <li>Describe mechanism of action of</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 24, Page 429,445)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 440,446)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 22,Page 743)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter</li> </ul>	1. https://youtu.be/1c6a0BNs yek 2. https://www.britannica.co m/science/insulin 3. https://www.medicalnewstoda y.com/articles/316427#overvie w	C1 C1 C2 C1 C2 C1 C2 C1 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

	glucagon  • Discuss regulation of secretion of glucagon  Explain the functions of glucagon	56,Page 902) Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 14. (Chapter 79, Page 973,982)				
Bone pathophysiology (rickets, osteomalacia, osteoporosis, hypo and hyperparathyroid ism	<ul> <li>Discuss in detail hypoparathyroidism</li> <li>Describe hyperparathyroidism Describe osteoporosis</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 21, Page 378,380,381,385,387)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 453)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 23,Page 779)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 54, Page 881,890)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 80, Page 1003,1006)</li> </ul>	<ol> <li>https://www.orthobullet s.com/basic- science/9031/rickets</li> <li>https://youtu.be/Srm2G H1dusg</li> <li>https://www.webmd.co m/osteoporosis/what- is-osteomalacia</li> </ol>	C2 C1 C1	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Insulin and Glucagon:Struct	<ul> <li>Describe physiological anatomy of pancreas</li> <li>Describe chemistry, synthesis and transport of insulin</li> <li>Describe the factors which affect</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 24, Page 429,445)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine</li> </ul>	1. <a href="https://youtu.be/1c6a0BNs">https://youtu.be/1c6a0BNs</a> <a href="yek">yek</a> 2. <a href="https://www.britannica.co">https://www.britannica.co</a>	C1 C1 C1 C2 C1		MCQ SEQ VIVA

ure and metabolic functions (Second week)	<ul> <li>secretion of insulin</li> <li>Discuss mechanism of action of insulin</li> <li>Describe the physiological actions of insulin</li> <li>Explain mechanism of insulin secretion</li> <li>Describe mechanism of action of glucagon</li> <li>Discuss regulation of secretion of glucagon</li> <li>Explain the functions of glucagon</li> </ul>	Physiology (chapter 09, page 440,446)  • Human Physiology by Dee Unglaub Silver thorn. 8 <sup>TH</sup> Edition. (Chapter 22,Page 743)  • Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition. Section 07(Chapter 56,Page 902)  4. Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 14. (Chapter 79, Page 973,982)	m/science/insulin 3. https://www.medicalnewstoda y.com/articles/316427#overvie w	C2 C1 C2 C2	SGD	VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE
Adrenal gland and its hormones (Fourth week)	<ul> <li>Describe physiological anatomy of adrenal gland</li> <li>Enumerate its various hormones</li> <li>Describe synthesis, transport &amp; metabolism of adrenocortical hormones</li> <li>Describe mechanism, physiological actions of aldosterone</li> <li>Explain the phenomenon of aldosterone escape</li> <li>Describe regulation of aldosterone secretion</li> <li>Enlist abnormalities of aldosterone secretion</li> <li>Describe mechanism, physiological actions of cortisol</li> <li>Discuss anti stress and anti-inflammatory actions of cortisol</li> <li>Describe regulation of cortisol secretion</li> <li>Discuss functions of adrenal androgens</li> <li>Describe the chemistry, secretion</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 20, Page 351-364)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 427)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 23,Page 765)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 53,Page 866)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 78,Page 955)</li> </ul>	1. https://youtube/2-Z3Q6BZuBY 2. https://journals.physiology.org/doi/abs/10.1152/ajplegacy.1964.207.1.109 3. https://www.britannica.com/science/aldosterone	C1 C1 C1 C2 C1 C2 C2 C1 C2 C1 C2	SGD	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment, MST based Assessment) OSPE

regulation of secretion of ACTH Discuss the actions of ACTH			

# **Biochemistry Small Group Discussion (SGDs)**

Topic	At The End Of Tutorial Students Should Be Able To	Learning	Teaching	Assessment
		Domain	Strategy	Tool
Classification	Classify Endocrine hormones	C1	SGD	MCQs
of endocrine hormones,	Disscus the mechanism of action of endocrine hormones	C2		SAQs Viva
Adrenocortical Hormones	Elaborate formation, functions & related disorders of adrenocortical hormones	C2	SGD	MCQs SAQs Viva

# **Anatomy Self Directed Learning (SDL)**

Topics	Learning objectives	Learning Resources	
	Describe the borders and surfaces of body and the two cornuas of hyoid bone.	Clinical Oriented Anatomy by Keith L.	
	Discuss the attachments on the hyoid bone.	Moore.6TH Edition. (Chapter 8, Page 982-	
Bones of neck	Discuss the related applied of hyoid.	985).	
Hyoid Bone, Cervical	Describe anatomical features of cervical typical & atypical vertebrae.	• https://youtu.be/Mrtt9s72a7I?si=-	
vertebrae	• Discuss the intervertebral joints& movements of cervical region of vertebral column.	ICPt14ihH7g0tKE	
	Discuss the anatomical basis of cervical pain & injuries of cervical vertebral column	https://youtu.be/4Q244XGveyQ?si=TH6I	
	Read relevant research article	MZJf43P_SBv3	
	Use digital library.		
	Discuss the location, attachments & actions of SCM & trapezius.	Clinical Oriented Anatomy by Keith L.	
	Describe boundaries & location of posterior cervical region .	Moore.6TH Edition. (Chapter 8, P 989-	
	Discuss suboccipital triangle of neck & its contents.	992).	
Sternocleidomastoid	Discuss related clinicals		
region & superficial &	• Discuss the location, attachments & actions of SCM & trapezius.		
deep fascias of neck	Describe boundaries & location of posterior cervical region .	https://youtu.be/nSaaWPzG4Zk?si=Muj6x	
	Discuss related clinicals	MILASIYKPOIE     https://youtu.be/dEpCSJajCew?si=OM4W	
	Read relevant research article	bKbS7Eodte4	
	Use digital library.		
	Describe boundaries of posterior triangle.	Clinical Oriented Anatomy by Keith L.	
	Discuss the muscles in lateral cervical region .	Moore.6TH Edition. (Chapter 8, Page 992-	
Lateral cervical region	• (splenius capitus ,levator scapulae ,middle scalene &posterior scalene.	999).	
	Describe boundaries and contents of occipital triangle	https://youtu.be/bk9KA2nR7PA?si=jBEzE	
	Discuss boundaries and contents of subclavian triangle	• https://youtu.be/kPUwVJE_j0I?si=	
	Discuss related clinicals	Ozn5s_bZLuoq-a	
	Read relevant research article		
	Use digital library.		

	Discuss the Muscles in anterior cervical region (suprahyoid muscle group)      infrahyoid muscle group)	Clinical Oriented Anatomy by Keith L.  Macra 6TH Edition (Chapter & Page 000)
	& infrahyoid muscle group)	Moore.6TH Edition. (Chapter 8, Page,999-1005).
Anterior Triangle	Discuss the anatomical basis of torticollis	https://youtu.be/hnLtAYvAMkw?si=EWZCqci
of neck & its	Discuss related clinicals.	
subdivisions	Discuss arteries in anterior cervical region (carotid system of arteries)	<u>SDZK91u04</u> <u>https://youtu.be/YOgE2pmXfZg?si=7hU-</u>
	Discuss veins in anterior cervical region	ZAw7wcaomUyI
	Discuss formation of cervical plexus	
	Enumerate branches of cervical plexus	
	Discuss area of distribution	
	Read relevant research article	
<u> </u>	Use digital library	
	■ Discuss anatomy & functions of thyroid& parathyroid gland	Clinical Oriented Anatomy by Keith L.
	Discuss blood supply of thyroid gland	Moore.6TH Edition. (Chapter 8, Page
Thyroid and para thyroid gland	■ Discuss lymphatic drainage of thyroid gland	• https://youtu.be/7_Rd7IIEZPI?si=mhoplC
myroiu gianu	■ Discuss nerve supply of thyroid gland	BjHSUL6pwI
	■ Discuss related clinicals.	https://youtu.be/ruOirrIc6oY?si=frzfEV7L
	Read a relevant research article	<u>qb52Pp6Q</u>
	Use digital library	
	Discuss the anatomy of soft palate.	Clinical Oriented Anatomy by Keith L.
	Along with attachment of muscles and their actions.	Moore.6TH Edition. (Chapter 8, Page
0.0.1.1	Describe boundaries of tonsillar fossa.	1021-1032).
Soft palate, larynx	Discuss larynx in detail with its cartilages and muscles.	https://youtu.be/eBn3PMX0tfk?si=h
	Discuss blood supply of larynx	Cg3/nm5DsR6T1_s
	Discuss functions of larynx	nups://youtu.be/4SDE1ZyJCV1?si=ZWS HGf-prTqR1kqi
	Discuss trachea (revisit).	
	Discuss related clinicals	
	Read a relevant research article	
	Use digital library	

# **Physiology Self Directed Learning (SDL)**

Topic	At The End Of Lecture Students Should Be Able To	References	<b>Learning Resources</b>	Learning Domains	Learning Strategy	Assessment Tools
(ON CAMPUS) Regulation of blood Glucose & Diabetes mellitus	<ul> <li>Describe various factors regulating blood glucose concentration</li> <li>Discuss the importance of blood glucose regulation</li> <li>Discuss the pathophysiology of diabetes mellitus</li> <li>Explain the physiology of diagnosis of diabetes mellitus</li> <li>Explain the treatment of diabetes mellitus</li> <li>Differentiate between type I &amp; type II diabetes mellitus</li> <li>Differentiate between diabetes mellitus &amp; diabetes insipidus</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 24, Page 435-438,446-448)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 445)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 22,Page 743)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 56,Page 915)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 79, Page 983)</li> </ul>	1. https://youtu.be/KY85 BUcQZew 2,https://www.pharma guideline.com/202 2/01/hormonal- regulation-of- blood-glucose- level.html 3.https://www.med icalnewstoday.com /articles/316427	C1 C2 C2 C2 C2 C2 C2 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment) OSPE SDL Evaluation
Abnormalities of adrenocortical hormone	<ul> <li>Discuss in detail Cushing's syndrome</li> <li>Differentiate between Cushing disease and Cushing's syndrome</li> <li>Discuss adrenogenital syndrome</li> <li>Discuss the physiological anatomy of adrenal medulla</li> <li>Enumerate various hormones secreted by adrenal medulla</li> <li>Describe the steps involved in synthesis of catecholamines</li> <li>Explain the function of catecholamines</li> <li>Discuss stress response</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup>         Edition.Section 03 (Chapter 20, Page 364-373)</li> <li>Physiology by Linda S.         Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 431,434,437)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup>         Edition.(Chapter 23,Page 765)</li> <li>Physiological Basis of Medical</li> </ul>	1. https://journals .physiology.or g/doi/abs/10.11 52/ajplegacy.1 964.207.1.109 2. https://youtu.b e/pSeU9Ei-3u4 3. https://medline plus.gov/adren alglanddisorder s.html	C2 C2 C2 C2 C1 C1 C2 C2 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment) OSPE SDL Evaluation

Bone pathophysiolog y (rickets, osteomalacia, osteoporosis, hypo and hyperparathyroi dism)	<ul> <li>Describe pheochromocytoma</li> <li>Discuss in detail hypoparathyroidism</li> <li>Describe hyperparathyroidism</li> <li>Describe osteoporosis</li> </ul>	Practice by Best & Taylor's.13 <sup>th</sup> Edition. Section 07(Chapter 53,Page 874,875)  Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 14. (Chapter 78, Page 969)  • Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 03 (Chapter 21, Page 378,380,381,385,387)  • Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 453)  • Human Physiology by Dee Unglaub Silver thorn. 8 <sup>TH</sup> Edition.(Chapter 23,Page 779)  • Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition. Section 07(Chapter 54, Page 881,890)  • Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 14.	1. <a href="https://www.orthobullets.com/basic-science/9031/rickets">https://www.orthobullets.com/basic-science/9031/rickets</a> 2. <a href="https://youtu.be/srm2GH1dusgg">https://youtu.be/srm2GH1dusgg</a> 3. <a href="https://www.webmd.com/osteoporosis/what-is-osteomalacia">https://www.webmd.com/osteoporosis/what-is-osteomalacia</a>	C2 C1 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment) OSPE SDL Evaluation
(OFF CAMPUS) Hypothalamic— pituitary axis & GH	<ul> <li>Recall the physiological anatomy and parts of pituitary gland</li> <li>Enumerate various cell types in pituitary gland along with their secretion and function</li> <li>Explain connections of anterior and posterior pituitary gland with hypothalamus</li> <li>Enlist various hormones secreted from anterior &amp; posterior pituitary gland</li> <li>Describe metabolic functions of growth hormone</li> </ul>	<ul> <li>(Chapter 80, Page 1003,1006)</li> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 17, Page 307,313,324)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 407,411)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 07,Page 241) (Chapter 23,Page 775)</li> </ul>	https://www.m dpi.com/2072- 6694/15/15/38 20 https://youtu.b e/fqz4WOwfz4 Q https://resources.wfsah q.org/atotw/the- hypothalamic-	1. C1 2. C1 3. C2 4. C1 5. C1 6. C2 7. C2 8. C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment) OSPE SDL Evaluation

	<ul> <li>Elaborate the role of growth hormone in soft tissue and bone growth</li> <li>Discuss role of somatomedins in relation with growth hormone</li> <li>Explain regulation of secretion</li> </ul>	<ul> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 51,Page 837)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 76, Page 929)</li> </ul>	pituitary-axis-part- 1-anatomy- physiology/			
Introduction to endocrinology & Signal transduction	<ul> <li>Classify hormones according to solubility and chemical nature</li> <li>Describe the nature&amp; synthesis of hormones</li> <li>Differentiate different classes of hormones</li> <li>Describe the secretion, transport, feedback control&amp; clearance of hormones</li> <li>Differentiate different classes of hormones</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 16, Page 301,304)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 395)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 07,Page 235,250)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 50,Page 817-831)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 75, Page 915-928)</li> </ul>	https://youtu.b     e/QLcxQT1fb     c      https://www.kh     anacademy.org     /science/ap-     biology/cell-     communication     -and-cell-     cycle/cell-     communication     /a/introduction-     to-cell-     signaling https://youtu.be/GHw MJnxaiys	C2 C1 C2 C1 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment) OSPE SDL Evaluation
Insulin and glucagon:	<ul> <li>Describe physiological anatomy of pancreas</li> <li>Describe chemistry, synthesis and transport of insulin</li> <li>Describe the factors which affect secretion of insulin</li> <li>Discuss mechanism of action of insulin</li> <li>Describe the physiological actions of insulin</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 24, Page 429,445)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition.Endocrine Physiology (chapter 09, page 440,446)</li> <li>Human Physiology by Dee</li> </ul>	1. <a href="https://youtu.be/1c">https://youtu.be/1c</a> <a href="mailto:6a0BNsyek">6a0BNsyek</a> 2. <a href="https://www.britan_nica.com/science/i_nsulin_nsulin">https://www.britan_nica.com/science/i_nsulin</a> 3.	C1 C1 C2 C1 C2 C1 C2 C1 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment)

	<ul> <li>Explain mechanism of insulin secretion</li> <li>Describe mechanism of action of glucagon</li> <li>Discuss regulation of secretion of glucagon</li> <li>Explain the functions of glucagon</li> </ul>	<ul> <li>Unglaub Silver thorn. 8<sup>TH</sup> Edition. (Chapter 22,Page 743)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 56,Page 902)</li> <li>Textbook of Medical Physiology by Guyton &amp;</li> </ul>	https://www.medicaln ewstoday.com/articles/ 316427#overview			OSPE SDL Evaluation
Aldosterone and cortisol	<ul> <li>Describe physiological anatomy of adrenal gland</li> <li>Enumerate its various hormones</li> <li>Describe synthesis, transport &amp; metabolism of adrenocortical hormones</li> <li>Describe mechanism, physiological actions of aldosterone</li> <li>Explain the phenomenon of aldosterone escape</li> <li>Describe regulation of aldosterone secretion</li> <li>Enlist abnormalities of aldosterone secretion</li> <li>Describe mechanism, physiological actions of cortisol</li> <li>Discuss anti stress and anti-inflammatory actions of cortisol</li> <li>Describe regulation of cortisol</li> <li>Describe regulation of cortisol</li> <li>Describe the chemistry, secretion regulation of secretion of ACTH</li> </ul>	Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 14. (Chapter 79, Page 973,982)  • Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 03 (Chapter 20, Page 351-364)  • Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 427)  • Human Physiology by Dee Unglaub Silver thorn. 8 <sup>TH</sup> Edition.(Chapter 23,Page 765)  • Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition. Section 07(Chapter 53,Page 866)  • Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 14. (Chapter 78,Page 955)	1. https://youtube/2-Z3Q6BZuBY  1. https://journals.physiology.org/doi/abs/10.1152/ajplegacy.1964.207.1.109  2. https://www.britannica.com/science/aldosterone	C1 C1 C1 C2 C1 C2 C2 C2 C1 C2 C2 C1 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment) OSPE SDL Evaluation
	<ul> <li>Discuss the actions of ACTH</li> <li>Recall physiological anatomy of thyroid gland</li> <li>Briefly explain secretions of thyroid</li> </ul>	Ganong's Review of Medical Physiology.25 <sup>TH</sup> Edition.Section 03 (Chapter 19,	1. <pre>https://youtu.b e/afVX3mlNB</pre>	C1 C2 C2		

Thyroid hormone:	<ul> <li>gland</li> <li>Compare the features of tri iodothyronine with thyroxine</li> <li>Describe the steps of synthesis of thyroid hormone</li> <li>Discuss in detail half-life, release, and transport of thyroid hormones</li> <li>Explain regulation of secretion of thyroid hormone</li> </ul>	<ul> <li>Page 337)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 419)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 23,Page 770)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 52,Page 855)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 77, Page 941)</li> </ul>	2. https://www.sc iencedirect.co m/topics/bioch emistry- genetics-and- molecular- biology/thyroid -hormone- release 3. https://byjus.co m/biology/thyr oid-hormone/	C1 C2 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment) OSPE SDL Evaluation
Abnormalities of thyroid hormone (Goiter, hypothyroidism and hyperthyroidis m)	<ul> <li>Enlist disorders of thyroid gland</li> <li>Discuss in detail causes, symptoms, diagnosis and treatment of hyperthyroidism</li> <li>Discuss in detail causes, symptoms, diagnosis and treatment of hypothyroidism</li> <li>Compare hypothyroidism with hyperthyroidism</li> <li>Differentiate between pituitary dwarfism and cretinism</li> </ul>	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup> Edition.Section 03 (Chapter 19, Page 344,345)</li> <li>Physiology by Linda S. Costanzo 6<sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 425)</li> <li>Human Physiology by Dee Unglaub Silver thorn. 8<sup>TH</sup> Edition.(Chapter 23,Page 773)</li> <li>Physiological Basis of Medical Practice by Best &amp; Taylor's.13<sup>th</sup> Edition. Section 07(Chapter 52,Page 861)</li> <li>Textbook of Medical Physiology by Guyton &amp; Hall.14<sup>th</sup> EditionSection 14. (Chapter 77, Page 950)</li> </ul>	1. <a href="https://www.ho">https://www.ho</a> <a href="pkinsmedicine.">pkinsmedicine.</a> <a href="pkinsmedicine.">org/health/con</a> <a href="ditions-and-diseases/disord">ditions-and-diseases/disord</a> <a href="ers-of-the-thyroid">ers-of-the-thyroid</a> <a href="thyroid">2. <a href="https://youtu.b">https://youtu.b</a> <a href="e/0vnpmaSI57">e/0vnpmaSI57</a> <a href="c">c</a></a>	C1 C2 C2 C2 C2 C2	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment) OSPE SDL Evaluation
	Discuss normal levels and metabolism of calcium and phosphate	<ul> <li>Ganong's Review of Medical Physiology.25<sup>TH</sup></li> </ul>	1. <a href="https://youtu.be/JY">https://youtu.be/JY</a>	C2 C1		

Calcium homeostasis (Vitamin D, parathyroid hormone and calcitonin)	<ul> <li>Describe the effects of hypocalcemia &amp; hypercalcemia</li> <li>Explain the absorption and excretion of calcium and phosphate</li> <li>Discuss in detail bone physiology</li> <li>Describe the steps involved the activation of Vitamin D</li> <li>Discuss the actions of vitamin D</li> <li>Describe the physiological anatomy of parathyroid glands</li> <li>Describe the chemistry &amp; regulation of secretion of parathyroid hormone</li> <li>Explain the actions of parathyroid hormones</li> <li>Describe functions and regulation of calcitonin</li> </ul>	Edition.Section 03 (Chapter 21, Page 375-386)  Physiology by Linda S. Costanzo 6 <sup>th</sup> Edition. Endocrine Physiology (chapter 09, page 448)  Human Physiology by Dee Unglaub Silver thorn. 8 <sup>TH</sup> Edition.(Chapter 23,Page 777,779)  Physiological Basis of Medical Practice by Best & Taylor's.13 <sup>th</sup> Edition. Section 07(Chapter 54,Page 881,890)  Textbook of Medical Physiology by Guyton & Hall.14 <sup>th</sup> EditionSection 14. (Chapter 80, Page 991)	QL7JEsF_4  2.https://teach mephysiolo gy.com/bio chemistry/e lectrolytes/ calcium- regulation	C2 C1 C2 C1 C1 C2 C1	SDL	MCQ SEQ VIVA VOCE MCQ (LMS based Aseessment,MS T based Assessment) OSPE SDL Evaluation
---	--	--	---	--	-----	---

# **Biochemistry Self Directed Learning (SDL)**

Topic	At The End Of SDL Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool	Learning Resources
Classification & Mechanism of action of Endocrine Hormones	<ul> <li>Classify Endocrine Hormones</li> <li>Discuss the Mechanism of action of various Endocrine Hormones</li> </ul>	C1 C2	SDL	MCQs SAQs Viva	1. Harper's Illustrated Biochemistry 32nd edition, chapter 41, pages 482-484  2. Lippincott Illustrated Reviews, Biochemistry, 8 <sup>th</sup> Edition, chapter 18, pages 265-266 <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6761">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6761</a> <a href="https://www.youtube.com/watch?v=KSclrkk_Ako">https://www.youtube.com/watch?v=KSclrkk_Ako</a>
Formation & Mechanism of action of Thyroid Hormone	Elaborate the nature, formation, mechanism of action and related diseases of Thyroxin	C2	SDL	MCQs SAQs Viva	<ol> <li>Harper's Illustrated Biochemistry 32nd edition, chapter 41, pages 492-493 and 498</li> <li>Lippincott Illustrated Reviews,         Biochemistry, 8<sup>th</sup> Edition, chapter 29, pages 452-454</li> </ol>

Synthesis & Mechanism of	<ul> <li>Describe synthesis, mechanism of action and functions of Aldosterone, Cortisol and Adrenal androgens</li> <li>Discuss related clinical disorders</li> </ul>	C2	SDL	MCQs SAQs	https://www.nature.com/articles/boneres201311 https://www.youtube.com/watch?v=cDGmsR2ZILE  1. Harper's Illustrated Biochemistry 32nd edition, chapter 41, pages 485-488, 491- 492, and 495-496, 498-499  2. Lippincott Illustrated Reviews,
Action of Adrenocortical Hormones	<ul> <li>Describe mechanism of action and role of Adrenal Medullary Hormones</li> <li>Discuss related diseases</li> </ul>	C2		Viva	Biochemistry, 8 <sup>th</sup> Edition, chapter 18, pages 262-266 <a href="https://www.ncbi.nlm.nih.gov/books/NBK470339/">https://www.ncbi.nlm.nih.gov/books/NBK470339/</a> <a href="https://www.youtube.com/watch?v=JII5N2N4d-k">https://www.youtube.com/watch?v=JII5N2N4d-k</a> <a href="https://www.sciencedirect.com/topics/medicine-and-dentistry/adrenal-medulla">https://www.youtube.com/watch?v=afzWLmd72Rk</a>
Synthesis & Mechanism of Action of Insulin & Glucagon	<ul> <li>Explain formation, mechanism of action and role of Insulin and Glucagon</li> <li>Discuss related diseases</li> </ul>	C2	SDL	MCQs SAQs Viva	<ol> <li>Harper's Illustrated Biochemistry 32nd edition, chapter pages 493-494</li> <li>Lippincott Illustrated Reviews,         Biochemistry, 8<sup>th</sup> Edition, chapter 23, pages 341-354</li> <li>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6515</li></ol>
Glucose Tolerance Test Curves Hypoglycemia Diabetic Ketoacidosis & Hyperosmolar Hyperglycemic State Online Clinical Evaluation	<ul> <li>Normal &amp; abnormal curves of glucose tolerance test and factors effecting it. Interpretation of GTT curves for Diabetes Mellitus</li> <li>Hypoglycemia, Hyperglycemia &amp; Diabetic ketoacidosis</li> </ul>	C2	SDL	MCQs SAQs Viva	<ol> <li>Harper's Illustrated Biochemistry 32nd edition, chapter pages 719-720, 136-138 &amp; 469-470</li> <li>Lippincott Illustrated Reviews, Biochemistry, 8th Edition, chapters 23 &amp; 25, pages 350-354 &amp; 375-387</li> <li>https://www.ncbi.nlm.nih.gov/books/NBK532915/https://www.youtube.com/watch?v=SRZIYdQWO3ghttps://www.ncbi.nlm.nih.gov/books/NBK279052/https://www.youtube.com/watch?v=jCf7W1U4JKEhttps://www.ncbi.nlm.nih.gov/books/NBK534841/</li> </ol>

# **Histology Practicals Skill Laboratory (SKL)**

Topic	Learning Objectives At the end of practical students should be able to	Learning Domain	Teaching Strategy	Assessment Tool
	Identify the histological slide of the pituitary gland	P		
Histology of pituitary gland	• Illustrate the histological structure of the pituitary gland	C2	Skill lab	OSPE
	Enlist two points of identification	C1		VIVA
	Identify the histological slide of the adrenal gland	P		
Histology of adrenal gland	Illustrate the histological structure of the adrenal gland	C2	Skill Lab	OSPE
	Enlist two points of identification	C1		VIVA
	• Identify the histological slide of the thyroid and parathyroid gland	P		
Histology of thyroid and parathyroid gland	• Illustrate the histological structure of the thyroid and parathyroid gland	C2	Skill lab	OSPE VIVA
	Enlist two points of identification	C1		
Histology of pancreas	Identify the histological slide of the pancreas	P		
	Illustrate the histological structure of the pancreas	C2	Skill lab	OSPE
	Enlist two points of identification	C1		VIVA

## **Physiology Practicals Skill Laboratory (SKL)**

Topic	At The End Of Lecture Students Should	References	Learning	Learning	Learning
	Be Able To		Resources	Domains	Strategy
	• Principle	Practical Notebook of Physiology First year			Viva Voce
Examination of pupillary	• Procedure	MBBS by Dr Saqib Sohail	A3/P3/C1	Practicals	Ospe
reaction	<ul> <li>Precautions</li> </ul>			/skill lab	Video Assissted
	<ul> <li>Clinical correlation OF Pupillary</li> </ul>				Assessment
	Reactions				
	<ul> <li>Apparatus identification</li> </ul>	Practical Notebook of Physiology First year			Viva Voce
Checking for color	• Principle	MBBS by Dr Saqib Sohail	A3/P3/C1	Practicals	Ospe
vision	• Procedure			/skill lab	Video Assissted
	• Precautions				Assessment

	Clinical correlation for color vision				
	Revision	Practical Notabook of Physiology First year			Viva Voce
Davisian of musetical	• Revision	Practical Notebook of Physiology First year	A 2 /D2	Duantinala	
Revision of practical		MBBS by Dr Saqib Sohail	A3/P3	Practicals	Ospe
				/skill lab	Video Assissted
					Assessment

## **Biochemistry Practicals Skill Laboratory (SKL)**

Topic	At The End Of Practical Students Should Be Able To	C/P/A	Teaching	Assessment
			Strategy	Tool
Estimation of	Perform estimation of glucose by spectrophotometer	P		
Blood			Skill lab	OSPE
Glucose				
	• Explain the procedure of practical, normal & abnormal curves of glucose and	P		
GTT	factors effecting it Interpret the result of GTT		Skill lab	OSPE

## **Basic and Clinical Sciences (Vertical Integration)**

#### **Content**

- Case Based Learning (CBLs)
- Problem Based Learning (PBL)
- Vertical Integration Large Group Interactive Session (LGIS)

# **Case Based Learning Objectives (CBL)**

Subjects	Topics	At the end of the session the student should be able	Learning
		to	Domains
Anatomy	Multi Nodular Goitre with Hypothyroidism	Apply basic knowledge of subject to study clinical case.	C3
	• Torticollis	Apply basic knowledge of subject to study clinical case.	C3
Physiology	Adrenocortical Hormone	Apply basic knowledge of subject to study clinical case	C3
D: 1 : 4	<ul> <li>Thyrotoxicosis</li> </ul>	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	<ul> <li>Addison's Disease</li> </ul>	Apply basic knowledge of subject to study clinical case	C3

# Vertical Integration LGIS Pathology

Topic	At the end of this LGIS students of should be able to:	Learning Domain	Teaching Strategy	Assessment Tool
Pituitary	Discuss pathogenesis of pituitary adenomas	C2		
disorders	Causes of hypopituitarism and posterior pituitary syndromes	C2	LGIS	MCQ's
	Describe pathogenesis of Tetany	C2		
Calcium	Causes of Hypoparathyroidism and     Hypoparathyroidism (primary and paged days)	C2		MCQ's
metabolism disorders	<ul> <li>Hyperparathyroidism (primary and secondary)</li> <li>Describe the pathogenesis of Rickets and</li> <li>Osteomalacia</li> </ul>	C2	LGIS	
	Describe the pathological features of Osteoporosis and osteopetrosis	C2		
	Define and discuss pathogenesis of	C2		
Adrenocortical	Addison's disease and Conn's syndrome	C2		
disorders	Describe the pathogenesis of Cushing syndrome	C2	LGIS	MCQ's
	• Explain dexamethasone suppression test and its role in diagnosis	C2		
	Define diabetes	C1		

Diabetes	Classify diabetes	C2	LGIS	MCQ's
mellitus	Discuss pathogenesis of type I and type II diabetes mellitus	C2		
	Define hypothyroidism and hyperthyroidism	C1		
Diagnosis of	Extract lab diagnosis of hypothyroidism and hyperthyroidism	C2	LGIS	MCQ's
thyroid	Describe clinical features of hyper and hypothyroidism	C2		

## Medicine

Topic	At the end of this LGIS students of should be able to:	Learnin g Domain	Teaching Strategy	Assessment Tool
Hypothyroidism and	<ul> <li>Discuss discuss pathophysiology, clinical manifestations of hypothyroidism and hyperthyroidism</li> </ul>	C2	LGIS	MCQ
hyperthyroidism	Workup and management	C2		
Hypocalcemia and	<ul> <li>Discuss pathophysiology, clinical manifestations of hypocalcemia and hypercalcemia</li> </ul>	C2	LGIS	MCQ
hypercalcemia	Workup and management	C2		
Diabetes mellitus	<ul> <li>Discuss pathophysiology, clinical manifestations of type I and type II diabetes mellitus</li> </ul>	C2	LGIS	MCQ
	Discuss Workup and management	C2		
	<ul> <li>Define and discuss pathophysiology</li> </ul>	C2		
Syndrome of	Discuss the causes	C2	LGIS	MCQs
inappropriate ADH	Describe clinical features	C2		
secretion (SIADH).	Describe the management	C2		
Cushing syndrome	Define and discuss pathophysiology	C1		
	Discuss the causes	C2	LGIS	MCQs
	Describe clinical features	C2		
	Describe the management	C2		

## Surgery

Topic	At the end of this LGIS students of should be able to:	Learning Domain	Teaching Strategy	Assessment Tool
	Enlist swellings infront of neck	C1		
	How to differentiate swellings in neck	C2		
	Explain What is Hyperthyroidism	C2	LGIS	MCQ
	What is Hypothyroidism	C2		
Thyroid	Appreciate MNG	C2		
Thyroid	Appreciate Solitary Nodule	C2		
	Appreciate Toxic Nodule	C2		
	Outline the investigations for Thyroid pathologies	C2		
	Outline the Management of different thyroid     Pathologies	C2		
	Enlist hormones secreted by Adrenal Gland	C2		
Adrenal Tumours	Describe Clinical Manifestations of different adrenal disease	C2	LGIS	MCQ
	Outline the management plan	C2		
Diabetic foot	Describe Diabetic Foot	C2		
	Classify Diabetic foot	C1	LGIS	MCQ
	Describe Pathophysiology of Diabetic foot	C2		
	Outline Management of Diabetic foot	C2		

# **Gynaecology & Obstetrics**

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Endocrine	Diabetes Mellitus:  • Know why pregnancy is a diabetogenic state	C2	<i></i>	
disorders in pregnancy	Define gestational diabetes mellitus (GDM)	C1	LGIS	MCQs
(diabetes mellitus,thyroid	Correlate clinical features with pathophysiology of GDM	C2		
disorders)	Outline brief management plan for these conditions	C2		
	<ul> <li>Know the methods for screening of diabetes in pregnancy</li> </ul>	C2		
	Thyroid disorders:	C1		
	Know pathophysiology of common thyroid disorders	C2		

	during pregnancy			
	Understand clinical presentation of thyroid disorders in	C2		
	pregnancy			
	Comprehend effects of thyroid disorders on mother and  fature	C2		
	fetus	C1		
	<ul> <li>Define primary amenorrhea, secondary amenorrhea and oligomenorrhoea.</li> </ul>	C1		
Primary amenorrhoea/ delayed puberty	<ul> <li>Enumerate the causes of amenorrhea:</li> <li>Hypothalamic</li> <li>Pituitary</li> <li>Ovarian</li> <li>Endometrial</li> <li>Structural</li> </ul>	C1	LGIS	MCQs
	<ul> <li>Understand physical and hormonal changes at puberty / secondary sexual characteristics</li> </ul>	C2		
	<ul> <li>Know basic pathophysiology of disorders of puberty</li> <li>Precocious puberty</li> <li>Delayed puberty</li> </ul>	C2		
	Identify clinical features of precocious puberty	C1		

### **Peadiatrics**

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Endocrine Problems	Differentiate between the clinical features of hypothyroidism	C2	LGIS	MCQs
	Interpret the investigations required for diagnosis of hypothyroidism	C2	LGIS	MCQs

## **Spirally Integrated Courses / General Education Cluster (GEC) Courses**

#### Content

- Longitudinal Themes
  - o The Holy Quran Translation
  - o Pak Studies/Islamiyat
  - o Behavioral Sciences
  - o Biomedical Ethics
  - o Early Clinical Exposure (ECE)

## Radiology & Artificial Intelligence

Topic	At The End Of Lecture Students Should Be Able To	U	O	
		Domain	Strategy	Tool
Basics of	• Categorize different tissues from most to least opaque on x-ray including: bone, soft tissue, air, metal, and fat	C2	LGIS	MCQs
Radiology	<ul> <li>Distinguish between the different types of contrast used in imaging exams and the</li> </ul>	02	2015	III Q S
	potential diagnostic benefits of each	C2	LGIS	MCQs

### **Behavioral Sciences**

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Psychosocial Assessment	• To be able to do a detailed interview keeping in mind the psychological and social aspects in predisposing, precipitating and maintaining diseases.	C2	LGIS	MCQs
Psychosocial Assessment	• To be able to do a detailed interview keeping in mind the psychological and social aspects in predisposing, precipitating and maintaining diseases.	C2	LGIS	MCQs

#### **Biomedical Ethics & Professionalism**

Topic	At The End Of Lecture Students Should Be	Learning Domain	Teaching	Assessment Tool	
	Able To		Strategy		
	Discussion on Health Research ethics focusing;	At the end of the session students	LGIS	1 MCQs of level C1 to C3	Guidelines and Teachers
	•Historical perspective of Tuskegee studies,	should be able to;	1hr contact	will cover this session	Handbook for Introducing
	Willow brook Experiment		session in	teachings in relevant block	Bioethics to Medical and Dental
	•Codes of medical ethics: traditional foundations	<ul> <li>Explain the meaning of the term</li> </ul>	2-4 parallel	examination in pool of total	Students
	and contemporary practice	"'ethics'".C1	classes,	04 MCQs.	http://nbcpakistan.org.pk/assets/
	•Nuremburg code, Belmont report, Declaration		Conducted by	Result / marks obtained will	may-16-bioethics-facilitator-
S	of Helsinki and importance of historical	• Describe the historical perspective of	Senior faulty.	contribute towards Internal	bookmay-16%2C-2017.pdf
thic	background of ethics in current research trends	global development of medical ethics.		assessment (IA) in 1 <sup>st</sup> Prof.	The Nuremberg Code:
of Medical Ethics	General ethical principles including	C1		MBBS exam.	http://www.hhs.gov/ohrp/archiv
ica	explanation of 04 basic principles of				<u>e/nurcode.html</u>
led	Beneficence, non-maleficence, respect and	• Describe the codes of medical ethics			10 WMA Declaration of
$\subseteq$	justice.	and their implications.C1			Helsinki:
/ 0]	- Interpretation research ethics for;				http://www.wma.net/en/30publi
COL	- Informed consent and confidentiality in	• Recognize ethical issues relevant to			cations/10policies/b3/
History	research HR	the case situation and apply the ethical			CIOMS Guidelines:
		codes as appropriate. C2			http://www.cioms.ch/publicatio
					ns/layout_guide2002.pdf.
		• Discuss the development of			Nuffield Council on Bioethics
		indigenous ethical codes in the South-			Guidelines:
		East Asian Region. C2.			http://www.sirc.org/news/nuffie
		<ul> <li>Demonstrate sensitivity to</li> </ul>			<u>ld.shtml</u>
		cultural diversity in medical care.C3			



# **Learning Resources**

Subjects	Resources			
Core Subjects & Horizontal Integration Subjects				
Anatomy	<ol> <li>Gross Anatomy</li> <li>Gray's Anatomy by Prof. Susan Standring 42th edition, Elsevier.</li> <li>Clinical Anatomy for Medical Students by Richard S. Snell 10<sup>th</sup> edition.</li> <li>Clinically Oriented Anatomy by Keith Moore 9<sup>th</sup> edition.</li> <li>Cunningham's Manual of Practical Anatomy by G.J. Romanes, 16th edition, Vol-I, II and III</li> <li><a href="http://www.anatomyzone.com/3D anatomyhttps://teachmeanatomy.info/">http://www.anatomyzone.com/3D anatomyhttps://teachmeanatomy.info/</a></li> <li>B. Histology         <ol> <li>B. Young J. W. Health Wheather's Functional Histology 6<sup>th</sup> edition.</li> <li>Medical Histology by Prof. Laiq Hussain 7<sup>th</sup> edition.</li> <li>https://www.udemy.com/course/histology/</li> </ol> </li> </ol>			
	C. Embryology  1. Keith L. Moore. The Developing Human 11 <sup>th</sup> edition.			
	2. Langman's Medical Embryology 14 <sup>th</sup> edition.			
	<ul> <li>A. Textbooks</li> <li>1. Textbook Of Medical Physiology by Guyton And Hall 14<sup>th</sup> edition.</li> <li>2. Ganong 'S Review of Medical Physiology 26<sup>th</sup> edition.</li> </ul>			
Physiology	<ol> <li>Reference Books</li> <li>Human Physiology by Lauralee Sherwood 10<sup>th</sup> edition.</li> <li>Berne &amp; Levy Physiology 7<sup>th</sup> edition.</li> <li>Best &amp; Taylor Physiological Basis of Medical Practice 13<sup>th</sup> edition.</li> <li>Guyton &amp; Hall Physiological Review 3<sup>rd</sup> edition.</li> </ol>			
Biochemistry  1. Lippincott IIIustrated Reviews: Biochemistry – Wolters Kluwer 2. Harper's Illustrated Biochemistry 32th edition. 3. Lehninger Principle of Biochemistry 8 <sup>th</sup> edition. 4. Biochemistry by Devlin 7 <sup>th</sup> edition.				
Community Medicine	Textbooks  1. Community Medicine by Parikh 25 <sup>th</sup> edition. 2. Community Medicine by M Illyas 8 <sup>th</sup> edition. 3. Basic Statistics for the Health Sciences by Jan W Kuzma 5 <sup>th</sup> edition.			

Pathology/Microbiology	Textbooks  1. Robbins & Cotran, Pathologic Basis of Disease, 10 <sup>th</sup> edition.  2. Rapid Review Pathology, 5 <sup>th</sup> edition by Edward F. Goljan MD.  3. http://library.med.utah.edu/WebPath/webpath.html		
Pharmacology	Textbooks 1. Lippincot Illustrated Pharmacology 9 <sup>th</sup> edition.		
	Spiral Integration Subjects & General Education Cluster Courses		
Bioethics	Textbooks  1. Textbook of Medical Ethics by Erich H. Loewy (Author)		
Videography	The Five Cs of Cinematography by Joseph V. Mascelli Digital Video Production: A Comprehensive Guide by Anirban Das		
Leadership	Leadership and the New Science by Margaret J. Wheatley A Treatise on Good Works by Martin Luther		
Family Medicine	<ol> <li>Textbooks</li> <li>Textbook of Family Medicine" by Robert E. Rakel and David P. Rakel</li> <li>Essentials of Family Medicine" by Philip D. Sloane, Lisa M. Slatt, and others</li> <li>Textbook of Family Medicine" by Ian R. McWhinney</li> <li>Family Medicine: Principles and Practice" by Robert B. Taylor</li> </ol>		
Islamiat & Pak Studies	Islamiyat Lazmi by Muhammad Khalil		
	Vertical Integration Subjects		
Medicine	<ol> <li>Textbooks</li> <li>Harrison's Principles of Internal Medicine by J. Larry Jameson, Anthony S. Fauci, and others</li> <li>Davidson's Principles and Practice of Medicine by Stuart H. Ralston, Ian D. Penman, and others</li> <li>Kumar and Clark's Clinical Medicine by Parveen Kumar and Michael Clark</li> <li>Oxford Handbook of Clinical Medicine by Ian B. Wilkinson, Tim Raine, and others</li> </ol>		
Surgery	Surgery  Textbooks  1. Bailey & Love's Short Practice of Surgery by Norman S. Williams, P. Ronan O'Connell, and Andrew W. McCaskie		
Obsteterics & Gynecology	Textbooks  1. Obstetrics by Ten Teachers 2. Gynaecology by Ten Teachers		
Peadiatrics	Textbooks 1. Nelson Textbook of Pediatrics" by Robert M. Kliegman, Joseph St. Geme, and others		

	2. "Textbook of Pediatrics" by A. Parthasarathy	
Digital Resources		
Up To Date https://www.uptodate.com/contents/search		
RMU Digital library	http://www.digitallibrary.edu.pk/rmc.html	
International Resources		
USMLE	https://www.usmle.org/	
Plab	https://www.gmc-uk.org/registration-and-licensing/join-the-register/plab	
U World	https://www.uworld.com/	
Kaplan	https://mykaplan.co.uk/	



#### **Assessment**

Assessment is the systematic basis for making inferences about the learning and development of students. It is the process of defining, selecting, designing, collecting, analyzing, interpreting, and using information to increase students' learning and development.

#### **Assessment Policy**

This policy is applicable to all the students of the MBBS program of RMU for all modes of teaching (on campus/online/any other) from the date of approval by the RMU Academic Council.

#### 1. Guiding principles

- RMU has the responsibility to ensure to all the stakeholders that students have achieved the identified outcomes of the medical degree course.
- Assessment requires a variety of methods; no single method can completely ensure that the requisite competence level has been achieved. Hence each assessment instrument must be selected based on its utility index.
- Feedback, ensuring that the feedback loop is closed, should be provided to students following all assessments to ensure that students identify gaps in their learning and faculty can review future curricular and assessment content.
- The quality of the entire assessment including confidentiality of the assessment process must be ensured.
- The assessment process should be clear and transparent so that students know in advance the expectations (from students) and consequences of the assessment.
- Details of the conduct of examinations are available in the Examination policy document.

#### 2. Purposes of assessment

- Feedback to students regarding their readiness and deficiencies.
- To ensure appropriate competence has been achieved.
- Feedback to faculty to evaluate the effectiveness of the teaching program.

#### 3. Forms of assessments

#### **Formative Assessment**

A formative assessment refers to a low-stakes assessment that does not normally contribute towards a student's final grade. A formative assessment may include summarizing the main points in a lecture or a weekly quiz to test comprehension of the reviewed content.

(assessment for learning) is carried out throughout modules and clerkships using various strategies (at the discretion of module coordinators and clerkship directors) feedback. Formative assessment performance may be taken as a continuous assessment.

#### **Summative Assessment**

A summative assessment is any method of evaluation performed at the end of a unit that allows a teacher to measure a student's understanding, typically against standardized criteria. Assessment of learning takes place at the end of modules/ blocks and clerkships and comprises of:

#### a. Written assessment (50%)

Multiple Choice Questions (MCQs) 40% Will be as USMLE format

Extended Match Questions (EMQ) 10% Short answer questions (SAQs) 50%

#### b. Performance (Practical) assessment (50%)

Objective Structured Practical Examination (OSPE) Years I, II and III Objective Structured Clinical Examination (OSCE) Years IV - V Short cases will be included in OSCE

#### 4. Assessment and their timings

- The module/ clerkship teams will be responsible for their assessment plan mentioning assessment strategies, timings, and other essentials (please refer to the individual plans).
- Students will be briefed about the pattern and scoring of the assessments before the examination.
- Professional examination will be taken by RMU.

#### 5. Weekly LMS (learning management system) assessment of LGIS and SDL

- There will be weekly assessment of LGIS and SDL of whole week at end of week through LMS.
- The LMS result will be shared by module coordinator and DME through vice chancellor on weekly basis.

#### 6. Eligibility to appear in End Block Assessment (EBA)

- This will be applicable to all the blocks of undergraduate program
- 90% attendance in each subject will be mandatory
- Student must pass in all LMS, mid module assessments to appear in EBA
- There will be no remedial classes for attendance compensation
- There will be no remedial of assessment after poor performance

#### 7. Eligibility to appear in Pre-Annual Assessment (PAA)

- 90% attendance in each block is required to appear in PAA
- It is mandatory to appear in all EBA to appear in PAA
- Appraisal letter from head of departments will be needed to appear in pre-annual assessment.

#### 8. Attendance policy

- 90% attendance in each block is required to appear in PAA
- There will be extra marks given as per rules.
- Attendance of the students will be shared by coordinator of module and DME through vice chancellor RMU on weekly basis.

90% and above	20 marks
80-89%	10 marks
70-79%	5 marks
Below 70%	-5 marks
Below 60%	-10 marks
Below 50%	-20 marks

• These marks will be counted in annual professional assessment.

### 9. Eligibility to appear in annual professional assessment

- Minimum 60% score in pre-annual assessment is required to appear in annual professional examination.
- Written and practical /OSPE/OSCE should be passed separately.

### 10. Passing criteria in annual professional examination

• 60% marks will be needed to pass annual professional examination.

### 11. Total break up of assessment score

Annual professional exam weightage 70%Continuous internal assessment weightage 30%

#### **Internal Assessment**

Continuous Internal Assessment means the assessment based on continuous internal assessment (CIA) tests and assignments given to the students during an academic period.

Break up of internal assessment is as follows:

Continuo	Continuous Internal assessment (CIA) 100%											
End module-I (25% End module 10 LMS 03 Attendance 02	)	End block-1 End block LMS Attendance	(25%) 10 03 02									
Work place based ass Further division of 50	` ,	0%										
Ward test (50%)	Histories (20%)	Case presen	tation	Log 1 (10%)	books )	Research (10%)						

Once internal assessment is compiled it CANNOT be altered under ANY circumstance unless a clerical/ human error is detected. He will repeat classes and skills There will be no change in calculated internal assessment scores for supplementary University examination.

### 12. Research publication marks

- Extra marks will be given to students who will publish research article in student journal, resident journal or faculty journal.
- These marks will be adjusted in viva.

Name of journal	Marks
Faculty journal	20 marks
Resident journal	15 marks
Student journal	10 marks

# **Table of Specification (TOS) For Module Examination for First & Second Year MBBS**

		93.								D	omains	C-Core	Subje	ect (7	0%) L	evels	C1-C2,	HV- Horizo	ontal &	Vertic	al Integ	ration (	20%) Levels	C2-C3, S	- Spir	ral Int	egra	tion (1	0%) Leve	els C2-C3	A	145.8V				v.	v
												Th	eory	Cogr	nitive)	Asse	sment							40				477	F	Practical (	Skill & Attitu	de) Assessi	nent		0.5		
End of Module Assessment	Subject			M	CQs				EN	ИQs				SA	Qs				SEQs Mark		Marks	Total Marks Theory	Total Time			AV	OSPE		Time	AED Reflective Writing		OSVE		Total Practical Marks	Grand Total	Total Time of Module Assessment	
		C	HV	S	Total	M	larks	C	Total	N	Marks	С	Н	۷	S	Total	Marks	C	HV	5	Tota	I	incory		C	HV	S	Total	Marks			Viva	Сору	Total	Munto		
	Anatomy	19	4	2	25	-	25	1	1	419	5	3	1		1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
First Module	Physiology	19	4	2	25		25	1	1		5	3	1	Т	1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
	Biochemistry	19	4	2	25		25	1	1		5	3	1		1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
Formative- Week	ly LMS Based Assess	sment (	of 30 l	VCQ:	s (10 N	<b>ACQs</b>	per Su	ıbjec	t)																												
				,				v 15		1919																					11					9 9	
												Th	eory	(Cogr	nitive)	Asse	sment								3				F	Practical (	Skill & Attitu	de) Assessi	nent				Total Time of
End of Module Assessment	Subject			M	CQs				EN	ИQs				SA	Qs				SEQ	s		Marks	Total Marks	Total			AV	OSPE		Time	AED Reflective		OSVE		Total Practical	Grand Total	Module
		C	HV	5	Total	M	larks	C	Total	N	Marks	С	Н	٧	S	Total	Marks	С	HV	S	Tota	Ī	Theory	Time	C	HV	S	Total	Marks	10000000	Writing	Viva	Сору	Total	Marks	0.0070	Assessment
Cocond	Anatomy	19	4	2	25	3	25	1	1	100.00	5	3	1		1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
Second	Physiology	19	4	2	25	. 3	25	1	1	30 00	5	3	1		1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
Module	Biochemistry	19	4	2	25		25	1	1		5	3	1		1	5	25	3	1	1	5	45	100	2 HRS	7	2	1	10	50	50 min	15 min	45	5	50	100	200	6 HRS
Formative- Week	ly LMS Based Asses	smen to	of 30 l	VICQ:	s (10 N	<b>ACQs</b>	per Su	ıbjec	t)													A. 617.5	2.01,1		7.50			1,000							V- 100 1.00		

Block	Subjects	1	LMS	Bas	sed	l Assess	ment		/eV	OSPE			/L	Gran	Total Block
DIOCK	Subjects			100	M	ICQs		LabOSPE	IOSPE	COSPE	Total	Marks	Time	d Total	Time
		С	H۷	S		Total	Time	C	HV	5	iota	IVId1 KS	lime	Total	10-00-00-0
	Anatomy	21	(	5	3	30	30 min	14	4	2	20	60	6 HRS	90	10 HRS
BLOCK	Physiology	21	(	5	3	30	30 min	14	4	2	20	60	6 HRS	90	10 HRS
	Biochemistry	21	- (	5	3	30	30 min	14	4	2	20	60	6 HRS	90	10 HRS

50% Questions/OSPE Stations/Viva Stations will be from Foundation Module and 50% Questions will be from MSK-1 Module

For Each assessment student will have to individually pass Theory and Practical components

#### Marks per

Item

- 1	item	103	19591		20	24 82
	MCQ=1	EMQ=5	SAQ= 5	SEQ= 9	AVOSPE= 5	OSPE= 3
	OSPE T	ime=1 Round of 40 S	tudents =80 min	7-	,	
		3 Round of 40 S	tudents =240 min			
		OSVE=Time per stude	ent=5mins			

Weekly LMS Assessment													
Subjects Anatomy Physiology Diochemist													
No of MCQs*	30	30	30										
Marks/MCQ	30	30	30										
*MCC	Q=1 Mark ea	ch, 1 min eac	ch										

# Proposed Table of Specifications 1st Professional & 2nd Professional Assessments

**Dated 28/08/24** 

#### **Statutes:**

- 1. Scheduling: The First Professional MBBS and Second Professional MBBS shall be held at the end of first and second year.
- 2. **Subjects:** Every candidate shall be required to study the following subjects in each block
  - a. Core subjects- Integrated Anatomy, Integrated Physiology, Integrated Biochemistry
  - b. Vertically integrated Subjects- Community Medicine & Public Health, Behavioural Sciences, Pathology, Pharmacology, associated Clinical Subjects
  - c. Spirally Integrated subjects- HEC General Cluster ALPHA (Artificial Intelligence, Leadership, Professionalism, Humanities and Arts), Early Clinical Exposure (ECE).
- 3. Assessments: There will be three papers in first professional examination and four papers in the second professional examination
  - a. First Professional Examination- 900 Marks
    - i. Block 1 Assessment (Foundation & MSK-1 Modules)- 300 Marks
    - ii. Block 2 Assessment (MSK-2 & Blood/Immunity Modules)- 300 Marks
  - iii. Block 3 Assessment (Cardiovascular & Respiratory Modules)- 300 Marks
  - b. Second Professional Examination- 1000 Marks
    - i. Block 1 Assessment (GIT & Renal Modules)- 300 Marks
    - ii. Block 2 Assessment (Reproduction & CNS Modules)- 300 Marks
  - iii. Block 3 Assessment (Special Senses, Endocrinology Modules)- 300 Marks
  - iv. General Custer Assessment\*

(Islamic Studies/Civics & Pakistan Studies)- 100 Marks

\*Marks of General cluster assessment shall not be counted towards the total marks of any professional examination, and determination of position or merit of the candidate. Those failing the subject in both annual and supplementary examinations in these assessments shall be promoted, however they will be allowed two more attempts, failing which they shall be detained in the 3<sup>rd</sup> professional examinations.

4. Continuous Internal Assessment (CIA): Each block assessment will have a CIA of 30%.

- 5. Block paper Components: Each Block assessment will comprise of two components, "Theory component" and "Practical component".
  - 5.1 **Theory Component:** It will have "Objective Assessments" and "Subjective assessments" with a weightage ratio of 70% and 30% respectively.
  - 5.1.1 **Objective Assessments**: Tools of assessment will be One Best Type of Multiple Choice Questions (MCQs) with five options. Integration ratio in multiple choice questions will be 70% core, 10% Horizontal and 20% Vertical Integration. Each MCQ will carry One Mark and Time allowed per MCQ will be 1 minute. Each block assessment will have 75 MCQs with an assessment time of 75 minutes.
  - 5.1.2 **Subjective assessments**: Tools of assessment will be Structured Essay Type Questions (SEQs). Each SEQ will carry 5 Marks and time allowed per SEQ will be 10 minutes. Each block paper will have 6 SEQs and total time for SEQ paper will be 60 minutes.
  - 5.2 **Practical Component:** It will consist Objective Structured Practical Examination (OSPE) with a total of 15 stations with 4 minutes per station. Duration of each OSPE circuit will be 1 hour.
    - i. **Laboratory OSPE** (**LabOSPE**): This section will comprise of 7 stations from practical components of core subject areas. Each station will carry 5 Marks.
    - ii. **Integrated OSPE (iOSPE):** This section will comprise of total 3 stations (one station per core subject) with horizontal and vertical integration. Each station will carry 5 Marks.
    - iii. Clinically Oriented OSPE (coOSPE): This section will comprise of 2 stations, one for ECE and one for ALPHA. Each station will carry 5 Marks.
    - iv. Objective Structured Viva Examinations (OSVE): This section will comprise of 3 stations (one per core subject) where student will be examined by the external examiner using a structured making rubric. Each station will carry 15 Marks.
- 6 **Examination Eligibility:** Eligibility to appear in professional will be as per RMU Assessment Policy approved by the Academic Council and Syndicate.
- Passing Criteria: A student will be declared successful in a block assessment if they score more than 50% in each block assessment component (Theory and Practical) and more than 50% marks in each core subject.
- 8 Supplementary Examination Criteria: The student who is unsuccessful in a block assessment will have to appear in the supplementary examination of the entire block.

Marks Distribution Tables: Total Marks distribution for each professional examination along with 30% CIA is given in the Tables 1 & 2.

**Table 1- 1**<sup>st</sup> **Professional Examination Marks** 

Subject	Theory				Practical		Total Marks
	Component	No of Items	Marks	Component	No of Items	Marks	
	Section I-MCQ	75	75	LabOSPE	7	45	210
Block 1	Section II-SEQ	6	30	iOSPE	3	15	
(Foundation &				coOSPE	2	10	
<b>MSK-1</b> )				OSVE	3	45	
	Continuous Internal Assessmen	it (30%)	45	Continuous Int	ernal Assessment (30%)	45	90
	Total Marks		150	<b>Total Marks</b>		150	300
	Section I-MCQ	75	75	LabOSPE	7	45	210
Block 2	Section II-SEQ	6	30	iOSPE	3	15	
				coOSPE	2	10	
(MSK-2 &				OSVE	3	45	
Blood/Immunity)	Continuous Internal Assessmen	it (30%)	45	Continuous Int	ernal Assessment (30%)	45	90
	<b>Total Marks</b>		150	<b>Total Marks</b>		150	300
	Section I-MCQ	75	75	LabOSPE	7	45	210
Block 3	Section II-SEQ	6	30	iOSPE	3	15	
				coOSPE	2	10	
(CVS &				OSVE	3	45	
Respiration)	Continuous Internal Assessmen	it (30%)	45	Continuous Int	ernal Assessment (30%)	45	90
	Total Marks	150	<b>Total Marks</b>		150	300	
					Grand To	tal Marks	900

**Table 2- 2<sup>nd</sup> Professional Examination Marks** 

Subject	Theory				Practical		<b>Total Marks</b>
Block 1	Component	No of Items	Marks	Component	No of Items	Marks	7
(GIT & Renal)	Section I-MCQ	75	75	LabOSPE	7	45	210
	Section II-SEQ	6	30	iOSPE	3	15	
				coOSPE	2	10	
				OSVE	3	45	
	Continuous Internal Assessment (30	%)	45	Continuous Inter	nal Assessment (30%)	45	90
	Total Marks	,	150	<b>Total Marks</b>	, ,	150	300
Block 2	Section I-MCQ	75	75	LabOSPE	7	45	210
(Reproduction &	Section II-SEQ	6	30	iOSPE	3	15	
CNS)				coOSPE	2	10	
				OSVE	3	45	
	Continuous Internal Assessment (30	<del> </del> %)	45	Continuous Inter	nal Assessment (30%)	45	90
	Total Marks		150	<b>Total Marks</b>		150	300
Block 3	Section I-MCQ	75	75	LabOSPE	7	45	210
(Special Senses &	Section II-SEQ	6	30	iOSPE	3	15	
<b>Endocrinology</b> )				coOSPE	2	10	
				OSVE	3	45	
	Continuous Internal Assessment (30	<u> </u> %)	45	Continuous Inter	nal Assessment (30%)	45	90
	Total Marks	,	150	<b>Total Marks</b>	, ,	150	300
HEC General Cluster	Islamic Studies /Civics		•	4 LEQs- 10 Mark	ks each	•	40
(Islamiat/Ethics &	Pakistan Studies			3 LEQs- 10 Marks Each			30
Pakistan Studies)		0/\					20
	Continuous Internal Assessment (30	%)			30		
	Total Marks				~ -	m . 175 -	100
					Grand	Total Marks	1000

# 1<sup>st</sup> Professional Examination Block 1 Assessment Foundation & MSK-1 Modules

Theme	Subject		Theory					Practical				Total M per sub	
Theme		MCQ	SEQ	Marks	%	LabOSPE	iOSPE	coOSPE	OSVE	Marks	%	Marks	%
	Marks per Item	1	5	Marks	70	5	5	5	15	Marks	70	Marks	70
Normal Structure	Anatomy & Applied /Clinical	22	2	32	30	3	1	-	1	35	32	67	32
Normal Function	Physiology & Applied/Clinical	18	2	28	26	2	1	-	1	30	29	58	28
Normal Function	Biochemistry & Applied/clinical	18	2	28	26	2	1	-	1	30	29	58	28
Disease Burden & Prevention	Community Medicine & Public Health	4	1	4	4	-	-	-	-	-	-	4	2
Frevention	Behavioural Sciences	4	1	4	4	-	-	-	1	-	1	4	2
Pathophysiology and	Pathology	5	-	5	6	-	-	-	1	-	-	5	2
Pharmacotherapeutics	Pharmacology	4		4	4	-	-		-	-	-	4	2
ECE		-	-	-		-	-	1	-	5	5	5	2
ALPHA		1	-	-		-	-	1	-	5	5	5	2
Total	·	75	6x5=30	105	100	7x5=35	3x5=15	2x5=10	3x15=45	105	100	210	100

# 1<sup>st</sup> Professional Examination Block 2 Assessment MSK-2 & Blood/Immunity Modules

Thomas	Subject		Theory				Total M per sub				
Theme		MCQ	SEQ	Marks	LabOSPE	iOSPE	caOSPE	OSVE	Marks	Marks	%
	Marks per Item	1	5	Marks	5	5	5	15	Marks	Marks	70
Normal Structure	Anatomy & Applied /Clinical	33	3	48	5	1	-	1	45	93	44
Normal Function	Physiology & Applied/Clinical	14	2	24	1	1	-	1	25	49	23
Normal Function	Biochemistry & Applied/clinical	9	1	14	1	1	-	1	25	39	19
Disease Burden & Prevention	Community Medicine & Public Health	5	-	5	-	-	-	-	-	5	2
Prevention	Behavioural Sciences	4	1	4	-	-	-	-	-	4	2
Pathophysiology and	Pathology	6	1	6	-	-	-	-	-	6	3
Pharmacotherapeutics	Pharmacology	4	-	4	-	-	-	-	-	4	2
ECE		-	1	-	-	-	1	-	5	5	5
ALPHA		-	1	-	-	-	1	-	5	5	5
Total		75	6x5=30	105	7x5=45	3x5=15	2x5=10	3x15=45	105	210	100

# 1st Professional Examination Block 3 Assessment CVS & Respiratory Modules

	Subject		Theory				Practical			Total M	
Theme	, v	MCQ	SEQ	Marks	LabOSPE	IOSPE	coOSPE	OSVE	Marks	Manka	%
	Marks per Item	5	5	Marks	5	5	5	5		Marks	%0
Normal Structure	Anatomy & Applied /Clinical	13	2	23	1	1	-	1	25	48	23
Normal Function	Physiology & Applied/Clinical	30	3	45	4	1	-	1	40	85	40
Normal Function	Biochemistry & Applied/clinical	15	1	20	2	1	-	1	30	50	24
Disease Burden & Prevention	Community Medicine & Public Health	5	-	5	-	-	-	-	-	5	2
Prevention	Behavioural Sciences	2	1	2	-	-	-	-	-	2	1
Pathophysiology and	Pathology	6	-	6	-	-	-	-	-	6	3
Pharmacotherapeutics	Pharmacology	4	-	4	-	-	-	-		4	2
ECE		-	-	-	-	-	1	-	5	5	5
ALPHA		-	ı	-	-	-	1	-	5	5	5
Total		75	6x5=30	105	7x5=50	3x5=15	2x5=10	3x15=45	105	210	100

# 2<sup>nd</sup> Professional Examination Block 1 Assessment GIT & Renal Modules

The	Subject	Theory			Practical					Total M per sub	
Theme		MCQ	SEQ	Marks	LabOSPE	iOSPE	coOSPE	OSVE	Marika	Marks	%
	Marks per Item	1	1 5	Marks	5	5	5	15	Marks	Marks	70
Normal Structure	Anatomy & Applied /Clinical	20	3	35	3	1	ı	1	35	70	33
Normal Function	Physiology & Applied/Clinical	14	2	24	2	1	ı	1	30	54	26
Normal Function	Biochemistry & Applied/clinical	18	1	23	2	1	1	1	30	53	25
Disease Burden & Prevention	Community Medicine & Public Health	6	-	6	-	-	-	-	-	6	3
Prevention	Behavioural Sciences	5	-	5	1	-	1	-	-	5	3
Pathophysiology and	Pathology	8	-	8	-	-	-	-	-	8	4
Pharmacotherapeutics	Pharmacology	4	-	4	-		-	-	-	4	2
ECE		-	-	-	-	-	1	-	5	5	2
ALPHA		-	-	-	-	-	1	-	5	5	2
Total		75	6x5=30	105	7x5=35	3x5=15	2x5=10	3x15=45	105	210	100

# 2<sup>nd</sup> Professional Examination Block 2 Assessment Reproduction & CNS Modules

T1	Subject	Theory Practical			Theory			Practical					Practical				Total M	
Theme		MCQ	SEQ	Marks	LabOSPE	iOSPE	coOSPE	OSVE	Marks	Marks	%							
	Marks per Item	1 5	IVIarks	5	5	5	15	Marks	Marks	70								
Normal Structure	Anatomy & Applied /Clinical	26	3	41	4	1	-	1	40	81	39							
Normal Function	Physiology & Applied/Clinical	16	2	26	2	1	-	1	30	56	27							
Normal Function	Biochemistry & Applied/clinical	10	1	15	1	1	-	1	25	40	19							
Disease Burden &	Community Medicine & Public Health	7	-	7	-	-	-	-	-	7	3							
Prevention	Behavioural Sciences	4	-	4	-	-	-	-	-	4	2							
Pathophysiology and	Pathology	11	-	11	-	-	-	-	-	11	5							
Pharmacotherapeutics	Pharmacology	2	-	2	-	-	-	-	-	2	1							
ECE		-	-	-	-	-	1	-	5		5							
ALPHA		-	-		-	-	1	-	5		5							
Total	<u>-</u>	75	6x5=30	105	7x5=35	3x5=15	2x5=10	3x15=45	105	210	100							

# 2<sup>nd</sup> Professional Examination Block 3 Assessment Special Senses & Endocrinology Modules

Th	Subject		Theory			Practical					Practical				Total M	
Theme		MCQ	SEQ	Marks	LabOSPE	iOSPE	coOSPE	OSVE	Marks	Marks	%					
	Marks per Item	1 5	IVIarks	5	5	5	15	Marks	Marks	70						
Normal Structure	Anatomy & Applied /Clinical	21	2	31	3	1	-	1	35	66	32					
Normal Function	Physiology & Applied/Clinical	23	3	38	3	1	-	1	35	73	35					
Normal Function	Biochemistry & Applied/clinical	8	1	13	1	1	-	1	25	38	18					
Disease Burden &	Community Medicine & Public Health	4	-	4	-	-	-	-	-	4	2					
Prevention	Behavioural Sciences	3	-	3	-	-	-	1	-	3	1					
Pathophysiology and	Pathology	11	-	11	-	-	-	-	-	11	5					
Pharmacotherapeutics	Pharmacology	6	-	6	-	-	-	-	-	6	3					
ECE		-	-	-	-	-	1	-	5	-	5					
ALPHA		-	-		-	-	1	1	5	-	5					
Total		75	6x5=30	105	7x5=35	3x5=15	2x5=10	3x15=45	105	210	100					



#### **Feedback And Evaluation**

Rawalpindi Medical University is dedicated to advancing equality, diversity, and inclusion across all its activities, processes, and cultural practices, in line with its Public Sector Equality Duties. This commitment encompasses promoting equality and diversity for everyone, regardless of any protected characteristic, working pattern, family circumstance, socio-economic background, political belief, or any other irrelevant distinction. Where pertinent to the policy, decision-making panels will ensure a reasonable gender balance (with at least one man and one woman) and will actively consider the representation of other protected groups.

**Principles** Feedback from students is essential to inform the development of the University's programmes and to help shape all aspects of their current and future learning and broader experience. The University actively seeks and encourages students to share their views. Our approach aims to create openness, responsiveness and a sense of partnership.

#### How feedback is received

#### > Informal Feedback

Informal feedback is received by day-to-day dialogue between students and staff,

#### > Formal Feedback

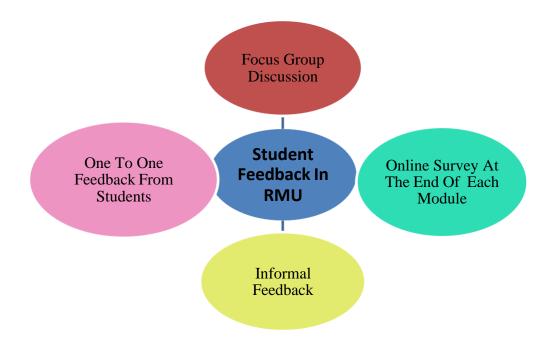
Feedback is received from students in more formal settings. These include:

### • Central survey campaign

The University regularly invites students to participate in anonymous surveys (Appendix 1).

The central surveys take place after every module, after every Block and at the end of the academic year. This schedule enables the University to work in conjunction with the students and help to improve the teaching, learning and assessment methodologies.

- Focus Group Discussion
- One To One Feedback from Students



### **Appendix -I Student Feedback Proforma for 2024**

(to be conducted after every module completion)

### **Module Content & Organization**

Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
The module objectives were informed.					
At the beginning of module study guide was					
available.					
The module workload was manageable.					
The pace of the module was manageable.					
The module was well organized.					
Module started and ended on time.					
End of block feedback was taken					

# **Learning Environment and Teaching Methods**

Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Lectures were delivered appropriately.					
Labs were conducted appropriately.					
Small group discussions were conducted appropriately					
Teaching sessions were as per schedule.					
CBLs were conducted appropriately					
Faculty was cooperative.					
Learning resources were communicated clearly					
SGDs were standardized between different batches					

# **Quality of Delivery**

Questionnaire	Strongly	Agree	Uncertain	Disagree	Strongly
	Agree				Disagree
The module stimulated my interest.					
Ideas were presented clearly.					

# **Learning Resources**

Questionnaire	Strongly	Agree	Uncertain	Disagree	Strongly
	Agree				Disagree
Learning Material was provided /					
recommended.					
Learning Resources were available in the					
library.					
Digital / Web Based resources were					
available.					
Power points of lectures were available					

### **Student Contribution**

Questionnaire	Strongly	Agree	Uncertain	Disagree	Strongly
	Agree				Disagree
I participated actively in the module.					
I believe I have made progress in this					
module.					

### Assessments

Questionnaire	Strongly	Agree	Uncertain	Disagree	Strongly
	Agree				Disagree
Class tests were conducted regularly.					
Class tests were helpful					
Test difficulty was appropriate.					
Written Assessment was as per Table of					
Specifications.					
OSPE Exam was as per Table of					
Specification					
Table of Specification was shared					

# LMS and its working

Questionnaire	, ,	Agree	Uncertain	Disagree	0.5
	Agree				Disagree
Easy Access to LMS					
Module Content was Available					