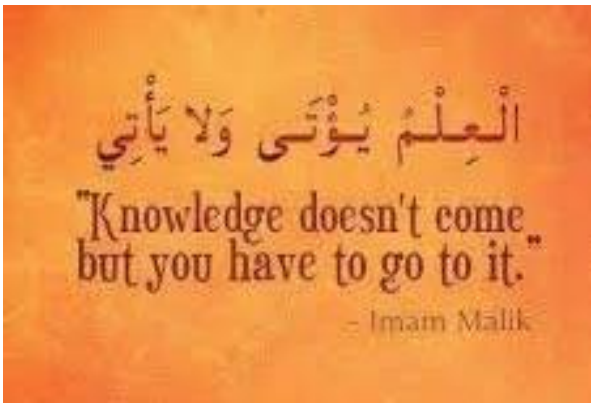
REGULATIONS & CURRICULAM

PhD ANATOMY PROGRAM

(2025)

In The Name Of Allah The Most Beneficent And The Most Merciful



Prepared By:

Director PhD Anatomy Program

Prof Dr. Saima Naz

MBBS, PhD Anatomy

Professor of Anatomy

Head of Department

Prof Dr. Ayesha Yousuf

MBBS, M Phil Anatomy

Professor of Anatomy

Additional Director DME

Prof. Dr. Ifra Saeed

MBBS, M Phil Anatomy

Professor of Anatomy

9.3	**GPA system**
9.4	**Plagiarism Policy**
9.5	**Flow Chart for PhD Scholars**

SECTION-I

INTRODUCTION TO UNIVERSITY

1.1 RMU at Glance:

Rawalpindi Medical College (RMC) was established in 1974. The founder principal of RMC, Prof. Abdul Latif (also an Anatomist), worked hard to establish the institution. Since 1974 more than 13000 students have graduated and are serving prominently at national and international stages. RMC was privileged to claim top positions in university examination several times. Rawalians have proved themselves and their institution time and time over again.

First Rawalian Principal, Prof. Mohammad Umar after taking over the office in 2013, embarked on a multi-dimensional approach to further develop the institution. Through his untiring and dedicated efforts, Rawalpindi Medical College was upgraded to Rawalpindi Medical University in 2017. PMDC & Higher Education Commission (HEC) gave NOC to RMU for many Post - graduate programs.

Academic programs of the university are accredited by UHS, CPSP and PMDC. The university got full recognition by General Medical Council UK, American specialty boards and internship programs with different universities abroad and WHO.

Rawalpindi Medical University has always occupied a unique position in the public sector, being one of the leading medical University in Pakistan. In 2021 and 2022, RMU was ranked first among medical universities of Pakistan by the Impact Times Higher Education (It is an international agency which gives ranking to universities). This achievement shows that RMU has become the fastest growing university of not only of Punjab but also of Pakistan. It serves as an extraordinary interface between health care provision and medical education; with the three allied hospitals bearing the brunt of the city's health care needs, medical and paramedical undergraduate courses that train the sharpest minds of the country, and diverse post-graduate training programs.

After successful launch of FCPS/MD/MS/PhD programs in different disciplines, Professor Umar is now very enthusiastic and making us work hard to get the PhD in Anatomy program at RMU approved from HEC & PMDC. PhD Anatomy is very rare and Prof, Umar’s initiative in this regard is very important.

Campus:

The University is divided in two campuses. Old teaching Block at Tipu Road campus & New Teaching Block at Holy family hospital.

Societies:

The various societies of the university include Rawalians Arts society, Rawalians sports society, Medicose Aid society, Rawalians literary society, Rawalians dramatic club, Rawalians student research society, Islamic society.

Magazine:

Shifa Magazine (Annual).

Research journals:

Journal of Rawalpindi medical college (JRMC), Resident journal of Rawalpindi medical college (RJRMU), Journal of Rawalpindi medical college student supplement (JRMCs) & Journal of Nursing and Allied health(JNAH).

Office of Research, Innovation and Commercialisation (ORIC):

In 2019 the university opened the Office of Research, Innovation and Commercialisation as the focal point of all research related activities. The university's research focuses primarily on medical developments and improvements in the health sector. Students also contribute to the university's research projects by publishing their work in the Student Journal & Resident journal of Rawalpindi Medical University.

1.2 RMU Mission Statement

- To impart evidence-based research oriented medical education in the field of Anatomy and associated subspecialties.
- To cultivate a community of scholars dedicated to advancing knowledge in field of anatomy through rigorous research, interdisciplinary collaboration, and innovation.
- To inculcate the values of mutual respect and ethical practice of medicine.
- To meet the requirements of Higher Education Commission (HEC) and Pakistan Medical and Dental Council (PM&DC) up to the level of satisfaction with accuracy & transparency.

1.3 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.
- To overcome deficiency and enhance standards of faculty in the field of Anatomy by establishing Anatomy Department of RMU as a number one seat of learning Anatomy in Pakistan and through it ,make available Anatomy faculty; which can act as a change agent for bringing up the standards of graduate as well as undergraduate Medical and Dentistry programs of Pakistan in general and Punjab in particular and make this program one of the best in Pakistan, covering all aspects of the specialty of Anatomy.
- To establish RMU as the Centre of Excellence in Pakistan for research in the field of Anatomy and its sub-specialties.

SECTION-II

2. INTRODUCTION TO PROGRAM

2.1 Starting PHD Anatomy at RMU

PhD programs in any subject are designed to act as catalysts for original research to expand the frontiers of the existing body of knowledge in that subject. Award of PhD degree marks the successful culmination of an intellectual pursuit and recognition that it has contributed new knowledge to the benefit of humanity and society. While pursuing a doctoral degree can be extremely daunting, requiring a certain level of intellect, a great deal of dedication and sustained hard work, there is no dearth of male and female doctors in Pakistan with requisite eligibility who find themselves motivated to accept the challenge because of the prestige associated with the degree and to contribute to the country. Presently, very few institutions in Pakistan offer a PhD degree in Anatomy. Dr Umar, the worthy Vice Chancellor has set about with full

vigor to address this deficiency at the earliest. RMU intends to start an indigenous PhD Anatomy program which not only produces doctoral-level anatomy educators for Academia but also gives impetus to and proliferates a high-quality research and scholarly work related to Human body in Pakistan. In line with the tradition of excellence espoused by him at RMU, Dr Umar wants Anatomy PhD to be carefully designed highly elaborate program, fostering research outlook and broadening horizons. To provide students opportunity to achieve a high level of scholarly competence to contribute novel research to existing knowledge in the anatomical sciences besides teaching the anatomical disciplines at undergraduate, postgraduate and professional levels.

2.2 SCOPE OF ANATOMY PhD PROGRAM

Anatomy forms the basis for the practice of medicine. It leads the physician towards an understanding of a patient's disease whether by physical examination or using imaging techniques. It is also important in allied health programs in aspects of patient management that begin with an analysis of clinical signs.

Knowledge and skills in the field of macroscopic and microscopic Anatomy will enable medical graduates to practice medicine successfully and scientists to pursue a career in the discipline of Anatomy. Knowledge of the structure of the human body from what can be seen with the unaided eye (gross anatomy) down to the molecular level is fundamental to understanding bodily function and how both structure and function are modified by disease.

During the last few decades, there has been an explosion of new techniques for imaging anatomy in living patients. Examples range from endoscopy and laparoscopy to computed tomography (CT) and magnetic resonance imaging (MRI), together with newly emerging technology for three-dimensional visualization. The emergence of these sophisticated imaging techniques has been accompanied by the development of minimally invasive therapy targeted to specific organs and/or sites within them. As a result, knowledge of anatomy has become increasingly important, not only to interpret the images that are produced by these sophisticated techniques, but also to understand the pathway for targeting therapy to a specific site. Ironically, at a time when knowledge of anatomy is increasingly important, we now are facing a crisis in anatomical education. A deepening shortage of experienced faculty members willing to teach gross anatomy to medical and dental students, as well as other health professions students, has developed. Keeping in view the persistent demand from students and urgent need for experts in the field of Anatomy, it is highly imperative to initiate our own PhD program in this field.

2.3 Goals of PhD Program

1. To expedite the academic growth and development in undergraduate medical education by providing properly qualified and trained basic sciences teachers.
2. To institutionalize research by producing more PhDs, particularly in the emerging fields of basic medical sciences.
3. Better educated and trained health care professionals engaged as academician, researchers and field practitioners will revamp the health care delivery system and replenish the academia in the medical education set up. The community will be the ultimate beneficiary due to better health facilities.
4. To improve health standards of the community in this underdeveloped region of the world, focus of research will be on regional medical issues.
5. Trained human resource will successfully execute and streamline the operations of the Institute and will fill the vacuum in the growing medical institutions and industry.
6. Development of human resource, research and technology at RMU will ultimately help in the development of national economy.

2.4 AIMS / OBJECTIVES

At the completion of the required period of training, the PG-trainee should be able to:

- Prove competency & clarity of concepts in Anatomy and Allied disciplines of the subject.
- Enhance postgraduate learning experience of the students through inculcation of research interest and promoting high quality postgraduate and research activities.
- Contribute to improvement in the quality of undergraduate program.
- Identify and manage common laboratory work problems.
- Provide better research opportunities to the students for in-depth study.
- Impart contemporary teaching and communication skills in the students.
- Inculcate critical thinking in the students and make them self-directed life-long learners.
- Equip graduates with high level of scholarly competence in the field of Anatomy as well as the associated enabling Analytical, IT & AI skills to compete with the very best in the contemporary world.
- Inculcate in them an attitude of professional excellence and responsibility for ethical behaviour and civic responsibility towards humanity in general and Pakistan in particular
- Provide strong leadership in the field of Research and Medical Education.

2.5 Alignment of Program Objectives with University Mission Statement

Objectives have been defined in the light of RMU Mission statement that requires output (health professional) as competent and ethically sound. This is achieved thorough predefined set of course content, availability of requisite facilities and feedback & evaluation of the program for continuous improvement.

2.6 Career Prospects in PhD Anatomy:

A PhD in Anatomy can open various exciting career prospects. Here are a few potential career paths:

- Teaching anatomy at universities and colleges
- Academic Researcher
- Conducting advanced research in anatomy.
- Supervising graduate and undergraduate students.
- Collaborating with healthcare professionals on research projects.
- Contributing to medical breakthroughs by conducting research in areas like genetics, or neuroscience.
- Working in research institutions
- Creating educational materials, textbooks, or scientific articles related to anatomy.
- Editing scientific journals by contributing in Editorial board of related journals.

SECTION-III

3. CRIETERIA FOR ADMISSION

3.1 Selection of candidates for admission as Scholars in PhD Anatomy Program

The selection of the scholars should be done with the desired outcome in mind. The Graduates of PhD Anatomy program shall have the attributes of a Subject specialist, Scientific researcher, Educator, Effective communicator and Collaborator. Selection of the scholars may be made after assessing the aptitude of the candidates for these roles.

3.2 Eligibility Criteria:

For Student; Eligibility criteria for admission in PhD Anatomy will be as under: -

(1) Basic Qualification: MBBS

(2) Postgraduate Qualification: a) MPhil / FCPS. Candidates who secured First Division in annual system or CGPA 3.0 out of 4.0 in semester system will be eligible for admission in PhD Program.

(3) GRE subject test with 60% percentile score (where subject is offered by ETS) OR GAT subject test with minimum of 60% Test Score (where subject is offered by NTS/ETS) OR If the Test is not available in NTS or ETS subject list, then 60% score, in test at par with GRE Subject Test, conducted by the University Committee consisting of subject expert with PhD degree in line with the policy of PMDC/HEC/ RMU (Annex 3.4 a of HEC policy *).

(4) The students having strong demonstrated interest in obtaining PhD degree, but their CGPA is below 3.00 (out of 4.0 in the semester system) or 60% marks (in the annual system) in the most recent degree obtained, may be admitted to a PhD program after fulfilling the following requirements:

i. Shall study additional courses of 9-12 CH of level 7 taking a zero semester at admission awarding university/HEI/DAI and score minimum 3.00 out of 4.00 GPA
ii. The admission committee is satisfied that the applicant's knowledge of primary area (level 7) has sufficiently prepared him or her to undertake the course of studies of the doctoral program.
iii. These requirements shall be in addition to any other requirements set in this policy for admission to a PhD program (Annex 3.3 c of HEC policy *).

3.3 Admission Process

An initial advertisement will be announced according to available slots with each potential supervisor in the Department according to the HEC rules. After an initial advertisement by the University for launching the PhD program for ANATOMY, applications will be invited based on the Eligibility criteria.

a) Application for admission to the PhD is made on the official application form available at RMU website (rmu.edu.pk) along with required documents. The required documents together with a hard copy of the duly filled in/complete admission application form along with receipt of application processing fee shall be sent through registered post or courier to the RMU Admission Office.

b) Applicants will submit a "statement of Purpose" (Annex 3.5 of HEC policy) * or a research proposal, along with their academic/research publications and information about their previous research & teaching experiences.

c) Entry test will be conducted by the university if required (Annex 3.4 a of HEC policy) *

d) Applicants will submit two letters of references from their previous Supervisor / Employer /Senior professional (The candidates in government service shall furnish no objection certificates from their competent departmental authorities for the educational activity being applied for) .

(3) Valid certificate of permanent or provisional registration with Pakistan Medical & Dental Council.

(4) The Admission Office shall thoroughly scrutinize all the applications received for admission, shall issue written entry test date, conduct the exam and shortlist the candidates, issue /interview schedule indicating venue and date to every short-listed candidate and coordinate with the Controller of Examinations for timely smooth conduct of the scheduled interviews through the Admission Committee.

(5) All those cases will never be entertained to apply for admission whose registration or admission in RMU has been earlier cancelled due to any disciplinary reasons.

(6) No objection certificate from HEC shall be mandatory in case of foreign students. A TOEFL score of 500 or IELTS score of 5.50 will also be included in eligibility criteria.

(7) The foreign students under international student exchange programs may be enrolled/ admitted, subject to prior approval from the Vice Chancellor for any single or more semester(s) or course(s) subject to such conditions as may be agreed by the competent authorities under the relevant exchange programs.

(8) The students may take courses/ Rotation at other HEC recognized universities subject to approval by the student supervisor and the concerned Dean.

3.4 Selection Criteria

Short listed candidates will be invited for interview by the PhD admission committee of the University. During the selection process the following elements will be considered:

i. Academic record of MBBS/M.Phil /Masters/FCPS/Equivalent

ii. Research publications or statement of purpose.

3.5 Interview

a. All applicants shall be required to present all their original academic credentials at the time of interview including good conduct from the Head of previous Institution/MS otherwise they shall not be eligible for appearance for interview.

b. The interview will be conducted by a board constituted by the Vice Chancellor, comprising minimum of three members and shall include a subject supervisor, dean & Vice Chancellor or his nominee.

c. The candidates scoring a minimum of 60% marks in the interview will pass the interview.

3.6 Final Selection & Merit Computation:

Determination of Merit

1.Admissions in PhD Anatomy shall be made purely on merit. (Weightage; 20% for previous academic performance, 50% for entry test/ GAT Subject / GRE score and 30% for interview)

2. The final merit list of names of the candidates selected and recommended for admission shall be conveyed to the Registrar's Office for seeking final approval from the Vice Chancellor.

3.The finally admitted students list shall be sent to the concerned Department for enlisting the filled-in registration forms from the students and then send to the Registrar's Office for eventual issuance of registration numbers.

4.After receiving the admission letter, the selected candidates shall be required to join on the date given in the admission letter, the failure to do so shall result in cancellation of admission

5.For any unforeseen reason, when a student cannot continue with his/ her studies in the University, the student may send an official request through his HOD and Dean/ Head of institution to the Registrar for clearance and notification of release from the University.

3.7 Teachers to Students Ratio:

Number of Students per supervisor should 4-5 PhD students in basic sciences of any post graduate program at any given time (PMDC**/HEC policy 2023*).

SECTION-IV

PROGRAM SPECIFICATION– PhD Anatomy

4.1 DURATION OF PROGRAM:

The PhD program at RMU will be minimum three (03) years duration and maximum Eight (08) years duration. (Annex 3.12 of HEC policy *)

4.2 Credit hours:

The student shall complete coursework of at least 48 credit hours (18credit hours of course work + 30 credit hours of Research & Thesis) (Annex 3.6 of HEC policy *)

a) The PhD Candidate (MPhil/MS degree holders) must undertake eighteen (18) Credit hour of coursework.

b) The coursework components will consist of designated courses that are compulsory within 12 months of enrolment in the program.

c) All PhD courses will be designated a course code of "8". For international comparability purposes the term, 'Doctoral or equivalent level' is used the level 8. (Annex 3.6 of HEC policy *)

- Out of 18 credit hours, four (04) credit hours are compulsory for all PhD students enrolled at RMU.

4.3 Curriculum Design

The Graduate of PhD in Anatomy will not only be a Subject Specialist but will also be a Scientific researcher, Educator, Effective communicator and Collaborator. Elaborate Curriculum is needed to be designed to equip the scholars of scholars for these important roles. Therefore, besides academic Anatomy, training and developing of the scholars in following should be integrated into the curriculum design:

- Research skills and methodology
- Analytical skills to conduct quality and credible research
- Educators capable of teaching medical anatomical discipline
- IT & AI skills to benefit from the tremendous resources
- Ethics & Responsibility
- Leadership
- Professionalism

4.4 PHD Anatomy –Program Specifications

Title	Specification
Course Duration	3-8 Years
Type of Study	Full time
Study System	Semesters system
Total Credit Hours-Coursework	18
Semester Wise distribution of Credit Hours (Course work)	Credit hours distribution Year 1 Semester 1=09 Semester 2= 09
Synopsis writing and approval	Year 1 Semester 1 = Research topic approval Semester 2 = Synopsis writing and comprehensive exam` Year 2 = research work Year 3 =research work & thesis writing
Schedule Distribution	Study per semester = 16 weeks Prep leave = 2 weeks Examination = 1 week Semester break = 1 week

- During study, the student can also have the option to specialize in one or more of the sub-disciplines of anatomy by selecting the research topic related to that sub discipline of Anatomy.

- A student can be registered for a maximum of three to four postgraduate level courses (9-12 Credit Hours) at a time during each semester or as per convenience of the department or the recommendation of the Director PGS/ Supervisor or as determined feasible by the academic council and approved by the syndicate.

- Each candidate must attend the mandatory workshops & course as required by the university.

- For international comparability purposes, PhD courses are usually designated a course code of "8" representing the highest level of academic achievement. Level 8 includes PhD as defined and mentioned in the National Qualifications Framework. (Annex 3.6 of HEC policy 2023)*/*** . Therefore, PhD Anatomy is given a code of ANA 800.

4.5 Curriculum Breakdown

Topics Year 1 Semester 1	Course code	Credit Hours 16 weeks/9 credits
Research Methodology & Medical writing		(1+0)
Biostatistics & Epidemiology		(1+0)
Musculoskeletal (core course)	ANA -801	(2+0)
Splanchnology (study of viscera) (core course)	ANA -802	(2+ 0)
Microscopic Anatomy & Laboratory techniques (core course)	ANA -803	(2+1)

Preparatory leave		2 weeks
Exams		1 week
Semester Break		1 week
Semester 2	**Course code**	**16 weeks/9 credit Hours**
Health Professional Education & Medical Ethics		(1+0)
Advances in Molecular Cell Biology & Bioinformatics		(2+1)
Developmental Anatomy (core course)	ANA -804	(2+1)
Neuro Anatomy (core course)	ANA- 805	(2+0)
Preparatory Leave		2 weeks
End Semester Exam		1 week
Semester break		1 week
Preparatory leave for Comprehensive exam		4 weeks
COMPREHENSIVE EXAM		

4.6 Committees for Overall Supervision of the PHD- Anatomy Program

1. PhD Admission Committee (AC)
2. Academic and Research Supervisory Committee (ARSC)
3. Board of Advanced Studies & Research (BASAR)
4. Ethical Review Committee (ERC)
5. PhD Synopsis Review Committee
6. Postgraduate Medical Education Committee (PGMEC) (Annex VI- 3 a of PMDC policy **)

4.7 Research Supervisory Process

To guide the supervisory process of doctoral dissertation towards the desired goals, the universities/DAIs/HEIs shall:

a) Devise a supervision manual and ensure its implementation, and

b) Constitute an Academic and Research Supervisory Committee (ARSC) for each individual doctoral student. Following may be the composition of the Committee:

a.	Chairman of the Department	Chairman
b.	Supervisor	Convener
c.	Co-supervisor (if any)	Member

d. One or two Expert(s) from the field of research Member(s)

(From University/Other Institution)

4.8 The Supervisor for PhD Scholar

Qualified supervision is an essential component for a successful PhD program in subject of Anatomy. The supervision will be tailored to meet the requirements of the individual PhD student and his development throughout the program. In selecting supervisors, the following elements may be considered.

Criteria of Supervisors for Launching PhD Programs:

- Holders of Level III qualification of relevant field are required to supervise Ph.D scholars (PMDC policy 2023)**
- HEC mandates a minimum of three PhD faculty members to ensure the academic integrity and credibility of the program (Annex 7.1.1 of HEC policy)*. In case of availability of only one PhD in a department, an eligible PhD faculty member from another department of the same institution and one PhD faculty member from another university from relevant speciality may contribute as adjunct member for the program (HEC notification on partial relaxation; 15-54/2019/Coord/QAD/HEC/897). Three PhDs ensures the program's stability by reducing the risk of dependency on a single individual.

The Co-Supervisor for PhD Program

- It is recommended that each PhD student can have up to 02 co-supervisors in addition to the main supervisor to cover all aspects of the program.
- The co-supervisor may not be content specialist in the chosen field of research but have great knowledge about the scientific area in question and can contribute to the PhD project and help the student with the research.
- Supervisor & co-supervisor shall not be related to a student by consanguinity or by affinity to the third degree inclusive or have a dual relationship with the student.

Change of a Supervisor/Co- supervisor

In case of absence/retirement of the existing Supervisor/ CoSupervisor, the PhD scholars shall be given the choice for the change of Supervisor. If there is Co-Supervisor from the domain then he/she can be shifted as Supervisor. Otherwise, Dean Postgraduate Studies has to arrange visiting PhD faculty (PMDC policy 2023)**

If the scholar is not satisfied or has reasonable evidence of having no interest of the supervisor, or any evidence of harassment, Scholar can apply for the change of supervisor to the chairman of the department who will discuss the case at appropriate level but decide within a month. When Dean Postgraduate Studies and Director BASR are satisfied that there is sufficient reason, it may change the Supervisor/Co-Supervisor of the Candidate on the request of either Scholar or the Supervisor.

4.9 Mode of Teaching Curriculum

Semester system

4.10 Program Delivery Methodology

- Interactive Lectures

- Tutorials
- Short Group Discussions
- Guided Self-study & SDLs
- Practical & OSPE Sessions
- Skill laboratory
- Dissection
- Presentations
- Seeking information through Journal clubs, library and Internet.
- Attending workshops, seminars, conferences
- Research work

The objectives of the training may also be achieved through following modes:

- Assigning responsibilities of teaching the undergraduates (MBBS and M.Phil).
- Seeking information through Journal clubs, library and Internet
- Attending workshops, Seminars, conferences etc.
- Arranging regular quiz sessions for students
- Completion of assignments
- Patient/case-based learning (CBL/PBL)
- Flip classroom technique
- Peer assisted learning (PAL)
- Assisting/Supervising Research projects of undergraduates and M. Phil students.
- Attachments with Federal, Provincial and District outlets to acquire technical know-how of laboratory work.
- Doctoral degree students will also be provided opportunities to rotate in different laboratories during the first two semesters with the intent of learning different methodologies, disciplines, and laboratory experiences before beginning more intensive research, thus encouraging interdisciplinary research and collaboration.

4.11 Responsibilities and Competencies of Post graduate trainees (PGTs):

We expect our PGTs to develop the Essential 7 core competencies of a doctor:

- Lifelong learner
- Researcher
- Communicator
- Care Provider
- Manager
- Decision maker
- Leader

❖ A logbook will be maintained by the student for the academic / basic sciences rotation

❖ The specialty specific competencies for training, as explained, will be identified by the respective Board of Studies and incorporated into their curriculum.

SECTION V
Methods of Evaluation

5.1 Program Output Evaluation

Program output is evaluated through:

- **Formative Assessments** (through regular feedback)
- **Summative Assessment** (through Examination)

5.2 Assessment Procedure

- Assignments/tests/logbook/portfolio

  (The performance of every student shall be continuously monitored and assessed throughout the semester. During the semester a student's performance shall be evaluated by taking quizzes, assignments, mid-Semester examination, laboratory reports, project presentations etc and will be maintained as "LOG BOOK")
- There will be Continuous Internal Assessments of each candidate during the training period. These Continuous Internal Assessments will include Assessments/Quiz/assigned tasks and supervisor's Review Report.
- There shall be two examinations for each course during each semester. These examinations shall be termed as Mid semester and End semester examination. In addition to these examinations, the instructor may give home assignments, demonstrations and class presentations.

5.3 Mid-semester and End-Semester Assessment

- Mid-semester and End-Semester exams shall also be taken during each semester covering the entire syllabus including theory and practical. The course teacher shall be responsible for the evaluation of work/performance of the students of his class and for the award of grades to them based on such evaluation.
- Mid-semester examination will primarily comprise of theory component comprising of MCQs, SEQs and Essay Questions. Viva voce can also be a component.
- End-semester examination will have theory component comprising of MCQs, SEQs and Essay Questions and practical examination. Viva voce will also be a component.

Evaluation Components /Assessment Type for Semester Course work a.

Theory Course

i) Quizzes/Assignments/Projects/ Presentations:

There shall be an appropriate number of quizzes/ assignments/ course project/ presentations etc. as maintained on logbook dually marked by teacher/instructor.

ii) Mid Semester Examination

There shall be one mid Semester examination of 2 hours duration for each theory course in a Semester after 8th week of teaching.

iii) End Semester Examination

There shall be separate End-Semester Examination for every subject. The duration of this exam will be 3 hours covering the entire course at the end of each Semester. The examination shall be held in the last 3 weeks of each regular Semester.

iv) Weightage of Evaluation Components /Assessments

The final grades shall depend on the marks obtained in each of the evaluation components listed above. The weightage given to each component is as follows:

Evaluation Component/ Assessment Type	Weightage
Quizzes/Assignments/Projects/ Presentations/Logbook etc.	25%
Mid Semester Examination	25%
End Semester Examination	50%

b. Viva & practical examination

The end Semester viva & practical examination will also be conducted jointly by the course teacher (i.e. Internal Examiner) and External/Neutral Examiner as notified by the relevant Chairman.

c. Combined Theory & Lab

Quizzes/Assignments/ Lab Projects/ Lab Report/Presentations etc.	25%
Mid Semester Examination	25%
End Semester Examination + Practical+ Viva Voce etc.	50%

Re-mid Examination

A student who fails to take his Mid Semester examination due to some unavoidable reasons shall apply in writing to the Chairman/VC for retaking mid Semester examination before the End Semester Examination. In case a student is allowed to retake Mid Semester Examination, the examination will be conducted by the concerned course teacher before the End Semester Examination on the payment of prescribed fee by the student.

5.4 Pass Marks

The minimum pass marks for each course shall be 60%/2.5 GPA (Grade C) and GPA ≥3.0/4.0 in Semester.

- Passing Comprehensive Exam (60% pass marks)

5.5 Failure/Improvement in a Course

a) A student obtaining less than 60%/2.5 GPA (Grade C) in any course shall be deemed to have failed in that course and will be awarded “F” grade.

b) If a student fails to appear in the final theory examination of a course he/she shall be treated as absent and declared to have failed in that course with “F” grade.

d)The candidate can improve the course already passed with grade “C” or below.

e) A student obtaining “F” grade in core course has to re- register for the course on the advice of Chairman/VC to pass it.

5.6 Dismissal from Program

If a student obtains "F" (Failing) grade in more than one courses at the end of first year of enrolment, he will be dropped from the degree program.

5.7 Comprehensive Examination

The Comprehensive Exam assesses the student's competency in the anatomical sub-disciplines and determines if the student is prepared to begin thesis research.

a) Comprehensive Exam must be conducted at the end of one year of enrolment (Annex 3.7 of HEC policy *)

b) To be eligible to appear in comprehensive examination, student must have passed 18 credit hours course work with a CGPA of minimum 3.0 out of 4.0 with evidence.

c) Paper of the comprehensive examination will be set by the Director of post graduate program, in consultation with the course teachers. One External Faculty member expert in the field of study can also be a paper setter who can be from other department of the university or from other university.

A certificate of satisfactory completion of the program by the Supervisor shall be mandatory for the eligibility to sit for course examinations. (Annex part 8 -2a of PMDC policy **)

d)Comprehensive examination will comprise of:

Two theory papers of 100 marks each:

i. Paper A: Major and Minor specific subjects (10 Essay Questions 10 marks each)

ii.Paper B: Major and minor specific subjects (10 Short Essay Questions of 05 marks each and 50 MCQs 01 mark each)

iii.The weightage of courses in the theory paper will be as per credit hours

e) Viva Voce Exam of 100 marks: Major and minor specific subjects. The viva voce exam will comprise of all the courses of major and minor specific subjects studied during the course work. Emphasis will be given to research aptitude of the scholar.

f) The viva will be conducted by the department through a panel of examiners with at least one examiner from one of the other relevant departments of the University or another University as approved by The Vice Chancellor RMU.

g) Passing marks for PhD Comprehensive examination will be 60%.

h) PhD Candidates will only be allowed a maximum of two chances to clear the comprehensive examination within two years of enrolment in the PhD program as per HEC policy.

i)In case of not qualifying the comprehensive examination in two (02) attempts student will no longer retain the status of "PhD candidate" of the university.

j) The comprehensive examination mentioned for the scholar will be prepared and conducted by PhD Research Monitoring Committee & ARSC .

5.8 Preparation and Approval of Synopsis by BASAR

a) In consultation with the supervisor/co-supervisor, the candidate will finalize research topic during first semester of the doctoral studies and positively will get it approved from his Academic and Research Supervisory

Committee (ARSC)

b) As per approved research topic, the candidate will prepare the synopsis as per format of the university, in consultation with the supervisor/co-supervisor, during second semester of the doctoral studies and positively will get it approved from his Academic and Research Supervisory Committee (ARSC), Ethical Review Board (ERB)and Board of Advanced Study and Research of the university (BASAR).

c) After the completion and passing of course work with CGPA of ≥3.0/4.0 and of scholar, and passing the Comprehensive Examination with 60% marks, the student can start the research work.

5.9 Review Article Submission: PhD Scholars of Anatomy program at RMU must write a review article on his/her topic of interest. It provides foundation of knowledge on topic. Review writing helps in Identification of areas of prior importance, gaps in research, conflicts in previous studies, open questions left from other researchers. Also Identify need for additional research.

5.10 Registration

To be registered as a "PhD Scholar" with the RMU, candidates must submit following documents to the Dean:
i. Completion of 18 Credit Hour Coursework
ii. Passing the Comprehensive Examination
iii. Approval of Synopsis by ERB & BASAR of the University

5.11 Suspension of Registration:

Where a PhD Scholar is unable to continue with their research program because of severe issues like health, family problems and financial reasons, BASAR may suspend their registration for a specified period of maximum up to 1 year. (PMDC policy 2023) **

5.12 Migration or transfer of postgraduate trainee:

Migration or transfer of students undergoing PhD shall not be permitted by any university or any authority without prior permission of HEC & PMDC. (PMDC**/HEC policy *2023)

5.13 Transfer of credit hours:

- PG can be facilitated for transferring the credit hours on special grounds However, PMDC guidelines are mandatory for all the DAI to follow at the time of transfer.
- No credit hour of a course will be transferred if the grade is less than C. Credit hours may only be transferred between recognized DAI nationally or internationally (PMDC policy 2023) **

SESSION VI

Evaluation & Monitoring of the Training Program

6.1 Progress Report

a) There will be a bi-annual review of research progress of the PhD Scholar by the Supervisor

b) At the end of every six months after confirmed registration, PhD scholar would submit a summary of the progress of the research work through the Supervisor to dean.

c) In case of more than two unsatisfactory reports forwarded to the PhD Committee, the scholar will be notified in written and given reasonable opportunity to respond to the PhD Committee. In Case PhD Scholar fails to satisfy the committee, the committee shall recommend removal of his/her name from university register.

d) There will be a time of 15 days given to the scholar to appeal to the BASAR through the Vice Chancellor against the decision and final decision BASAR will be implemented.

6.2 Evaluation methodologies

- To make sure that residents/students are evaluated fairly, the evaluators will attend workshops on evaluation methodologies.
- There will be structured viva and written assessments. Keys will be provided to evaluators for checking written papers/viva .
- For annual confidential written evaluations of the PGT by the students, Feedback proforma will be designed in which all aspects related to teaching like Knowledge, punctuality, tolerance level, professionalism, communication skills and behaviour with student will be covered.
- To ensure confidentiality students will be asked to fill proforma without showing their identity, different students will be asked to fill proforma at different times.
- All data will be computerized and a, pass code will be generated so only concerned person will be able to access these feedback proforma.
- A confidential letter will be written to PGT in which details of his/her annual Feedback will be told including all positive and negative aspects.
- He /she will be called in Supervisor's office to discuss areas where improvement is required.
- He/she will be encouraged to convert weaknesses into strengths by addressing his/her problems.

Students will be evaluated based on:

- Attendance record (at least seventy-five percent for each year of study).
- Performance of the scheduled / desired activity
- Participation in discussion (tutorial and seminar etc.)
- Efficiency and effort put in the assignment (lectures, demonstration, Computer training, etc.)
- Quiz
- Practical work
- Presentation and Computing skills

6.3 Standard of Passing the course work

- Cleared the semester exams.
- Cleared the comprehensive exam.

6.4 Criteria for Award of PhD Degree

- PhD level course work of at least 18 credit hours followed by course exam and a comprehensive examination, completion of research work along with thesis defense will be essential for the award of PhD degree.
- The thesis must be examined by two foreigner examiners from technologically/academically advanced countries (see 7.5 for details)
- Date of defense of the dissertation should be notified.
- At least one Published research paper in an HEC approved W category or 2 in X category journal is essential for the award of PhD degree.

6.5 Evaluation & Monitoring of the Training Program

The proposed / suggested evaluation of the training program will be done by:

a. The students

b. The faculty members (Program team Members)

c. The Supervisor

d. Self Assessment with External and Internal Evaluators (SAR)

This will be carried out by filling the HEC Program Evaluation Proforma by the concerned member followed by analysis and reporting.

SESSION VII

THESIS

7.1 Thesis Supervision

a) Supervisor & co-supervisors should be the full-time faculty members of the university and must be from the specialty that the student is enrolled in (Annex 4.4 of HEC policy *)

b) Eligibility of the Supervisor/co-supervisor will be in line with the HEC/PM&DC guidelines.

c)DEAN may also appoint a co-supervisor from any other related department to provide the link if the research is of an interdisciplinary nature or if the research is being undertaken in collaboration with another organization.

7.2 Modification /Change of Research Topic

a) A candidate may modify/change the topic of his/her research with the approval of the BASAR by submitting an application, duly supported by the Supervisor, DEAN and recommended by the PhD Committee.

b) The students can perform research/experiments at other HEC recognized universities/multidisciplinary Laboratories, subject to approval by the student supervisor, Dean & VC RMU.

7.3 Freezing of Registration/Discontinuation of PhD Research

HEC/PM&DC rules will be followed for termination or freezing of PhD program:

a) Where a PhD Scholar is unable to continue with their research program because of severe issues like health, family problems and financial reasons, BASAR may suspend their registration for a specified period of maximum up to 1 year.

b) The Scholar must be able to satisfy the BASAR of the University that any period of freezing will not adversely affect the viability of the candidate's research after consultation with the Supervisory Committee and DEAN.

c) Any period of freezing will be excluded from the calculation of the final submission date.

d) While registration is suspended, a Scholar is exempted from fees, and is not entitled to any tuition or supervision, or to the use of any other research resources of the University.

7.4 Thesis Submission

a. The supervisory committee advises the student throughout the conduct and completion of the doctoral research project, including the writing and defence of a Dissertation.

b. Thesis submission should be done within three to eight years of enrolment in the program.

c) Submitted thesis must accompany the plagiarism report along with all other documents prescribed by the Examination department of RMU

d) At the time of thesis submission, the supervisor would submit a list of the suitable local & foreign examiners that have relevant subject expertise through the DEAN to Controller of examination for approval.

7.5 Evaluation OF Thesis

a) The thesis will be presented by the student in Thesis Review Committee (TRC) to be notified by the Dean of Faculty/Director BASAR.
b) After satisfactory report of the TRC, the scholar shall submit seven copies of his/her thesis written on a prescribed format to the Dean's office through Supervisor and Chairman of the Department.
c) External Evaluation is one of the main elements for PhD research work as per HEC policy to get confidence of research work. The PhD thesis must be evaluated by:

At least two external experts who shall be:

i. PhD faculty member from the world top 500 universities ranked by the Times Higher Education or QS World Ranking in the year corresponding to dissertation evaluation year OR
ii. Pakistan-based Distinguished National Professors, from any national university with PhD degree

d) Each examiner will be provided with an electronic copy of the thesis and, acting independently, is required to provide the Controller of Examinations within two months of receipt of the thesis, with a written report on the quality of the thesis. If there is no response from examiner in two months after two reminders, the examiner will be replaced.

e) The examiners can suggest either of the following option:

- To award the degree, subject to satisfactory performance at the oral examination.
- To award the degree after specified "minor corrections" have been made to the thesis, to the satisfaction of the oral examiner, by a specified date, and subject to satisfactory performance at the oral examination.
- To permit the candidate to revise the thesis to incorporate the major changes suggested and resubmit it for examination.

f) In case of recommendations of minor or major corrections, the scholar would be asked to submit the correction within a specific period for further evaluation.

g) The evaluation reports of the examiners would be considered in the BASAR.

h) The scholar would be allowed to proceed to the oral examination if the evaluation reports approve her/his thesis.

A copy of PhD Dissertation (both hard and soft) must be submitted to HEC for placing/including in PhD Country Directory and for attestation of the PhD degree by the HEC in future.

7.6 Policy for PhD Thesis Writing

The thesis submitted by a PhD candidate shall comply with the following conditions:

a) It shall form a distinct contribution to knowledge and afford evidence of originality, shown by the discovery of new facts, by the exercise of independent critical judgment, and/or by the invention of new methods of investigation.

b) It shall not include research work for which a degree has already been conferred in this or any other university.

c) It shall be written in English, and the presentation must be satisfactory for publication.

d) Any part of the thesis which has been published before submission of the thesis may be appended at the end of the thesis.

e) If a student who is re-admitted to PhD program and had previously spent the minimum period of three years as a PhD student, he/she may be allowed to submit the thesis after one year from the date of his/her readmission.

7.7 Guidelines for Thesis Format

All thesis presented in typescript for the degree of PhD should comply with the following specifications unless permission to do otherwise is obtained from the relevant authority / body.

- SIZE OF PAPER. A4 size be used, no restriction is placed on drawings and maps.
- PAPER SPECIFICATION. Six copies on good quality paper (minimum 80g) be submitted.
- METHOD OF PRODUCTION. The text must be typewritten in acceptable type face and the original typescript (or copy of equal quality) must normally be submitted as the first copy. The second and subsequent copies may be produced by means of other acceptable copying methods.

- LAYOUT OF SCRIPT. Typescript should appear on one side only, lines; at least one-and-a-half spaced. Footnotes, quotations, references and photographic captions may be single spaced. Where appropriate, these should contain lists giving the locations of figures and illustrations.
- FONT SIZE Title Page Headings / subheadings, Text, Footnotes, Footnotes be given on the same page where reference is quoted
- TYPE STYLE. Times New Roman / Arial / Courier New
- MARGINS. At least 11⁄4 -11⁄2 inches (3.17-3.81cm) on the left-hand side, 3/4 - 1 inch (2 - 2.54cm) at the top and bottom of the page, and about 1⁄2 - 0.75 inches (1.27 - 1.90cm) at the outer edge. The best position for the page number is at top-centre or top right 1⁄2 inch (1.27 cm) below the edge. Pages containing figures and illustration should be suitable paginated.
- The thesis shall be hard bound with maroon cloth cover and golden lettering on the front and the spine.
- Spine of the thesis should show "PhD thesis" on top across the width of spine, name of the candidate in the middle along the length of spine, and the year of submission across the width at the bottom. Lettering on spine should be in 18 pt. and may be in boldface.

- **FOLLOWING IS THE PREFERABLE LAYOUT OF THE THESIS**
  - Title page
  - Abstract / Summary
  - Acknowledgements
  - Abbreviations
  - Contents
    - List of Tables (where applicable)
    - List of Figures (where applicable)
    - Introduction (including literature review)
    - Material and Methods
    - Results May be comprised of one chapter or a number of chapters depending upon the subject matter/ requirements
    - Discussion (including Conclusion(s),
    - Limitations of the study
    - Recommendation(s)
    - References / Bibliography / Literature Cited
    - Appendices (where applicable)
    - Any other information specific to the respective discipline

- **Title Page.** All thesis must contain a title page giving the title of the thesis, the author's name, the name of the degree for which it is presented, the department in which the author has worked or the faculty to which the work is being presented, and the month and year of submission.
- **Length of Thesis.** Whilst the regulations do not contain a clause relating to the maximum length of theses, it is expected that work presented for the degree of PhD should normally between 40,000 - 120,000 words of text. Candidates wishing to greatly exceed these sizes should discuss the matter with their supervisors.
- **Published Work.** Published/accepted for publication work from the thesis be included as appendix

7.8 Thesis Defense

a) There shall be a standing list of external examiners for the department consisting of persons of eminence in the field of research. The list shall be suggested from time to time by the board of studies of faculty concerned and approved by the research board. The external examiners will be requested to critically examine the thesis for its suitability for the award of PhD degree.

b) There shall also be a standing list of local examiners for department consisting of eminent person engaged in research in the field of Anatomy. The list shall be suggested from time to time by the board of studies of faculty concerned and approved by the research board. The local examiners will be requested to conduct the final viva-voce examinations of thesis.

c) The candidate shall in the first instance submit six unbound copies of his/her completed thesis along with an application on prescribed form for the evaluation of his/her thesis, duly forwarded by his/her supervisor and the chairman of the department:

- 03 for external
- 01 for examination section
- 01 for department office
- 01 for the supervisor

After corrections have been incorporated in accordance with the comments of external examiners; two copies of thesis in loose binding, to be sent to viva-voce examiners. After the viva-voce examination; four copies of the final hardbound thesis be submitted

d) The supervisor shall suggest a panel of at least six external examiners from the approved list.

e) The vice-chancellor shall appoint three external examiners from the suggested panel to evaluate the thesis.

f) The reports of the examiners shall be placed before the research board for consideration.

g) If the thesis is adjudged as adequate by two of the three examiners, the research board shall allow the candidate to appear in the viva-voce (thesis defense) examination.

h) If two of the three examiners find that the thesis is wholly inadequate it may be rejected by the research board.

i) If any of the examiners suggests modification/revision of the thesis, the candidate shall be required to resubmit a revised version of the thesis, duly certified by the supervisor, within one year.

j) The revised version of the thesis shall be approved by the same examiner who suggested modification/revision of the thesis.

k) If any of the examiners finds the thesis adequate but suggests minor modifications/revision, this may be incorporated without referring again to the examiner.

l) The viva-voce examination shall be conducted by the two external examiners appointed by the vice-chancellor from the panel approved by the research board, the supervisor and the chairman of the department concerned.

m)The viva-voce examination shall be open to the public, but the evaluation will be done only by the panel of examiners.

n) If the candidate fails to satisfy the examiners in the viva-voce examination, he/she may be given a chance to defend the thesis for the second and final time within a period of six months.

o) A candidate who successfully completes all the requirements shall be awarded, with the approval of the research board and the syndicate, the degree of Ph.D under the seal of the university.

p) The vice-chancellor may approve the recommendations of the research board on behalf of the syndicate regarding the award of Ph.D degree to the candidate. Reports of the examiners shall be placed before the research board for consideration.

Public Defense & Oral Examination

An open defense of Dissertation after positive evaluation of Dissertation is essential part of PhD Program.

a) The Controller of Examinations will arrange thesis examination.

b) Before the Oral examination, thesis will be presented by the scholar for public defense.

c) Public defense will be open for the entire faculty and student participation will be compulsory.

d) The examination must be attended by the Candidate, the Oral Examiners, and the DEAN or his Nominee. The main supervisor or co-supervisor will also be present.

e) The examiners will be provided the evaluation report of the thesis by foreign and local examiners.

f) On completion of the oral examination, the DEAN will provide a written report endorsed by the Examiners. The report can include following recommendations:

a. To award the degree, subject to satisfactory performance at the oral examination.

b. To award the degree after specified “minor corrections” have been made to the thesis, to the satisfaction of the oral examiner, by a specified date, and subject to satisfactory performance at the oral examination.

c. To permit the candidate to revise the thesis to incorporate the major changes Suggested and resubmit it for examination.

d. An open defense of the dissertation will be conducted after positive evaluation of the dissertation by the committee members.

e. After considering all the reports of the examiners, the DEAN will make the final decision as to the award of the PhD degree.

7.9 RMU PhD Publication Policy:

For award of PhD degree, a PhD researcher shall be required to publish research articles meeting the following criteria: At least:

i. One research article in W category journal or two research articles in X category journals (HEC policy 2023) *
ii. The PhD researcher shall be the first author of these publications. That will be followed by supervisor, cosupervisor and any other contributor.
iii. The research article shall be relevant to the PhD research work of the PhD researcher.

iv. The article shall be published after approval of the research synopsis.

v. The article shall be published in a relevant research journal.

7.10 HEC Requirements at completion of Degree:

The following documents will be submitted to the HEC following the completion of studies:

a) A duly filled completion form will be sent to the HEC from the Office of the Controller of Examinations of the university notifying the HEC that the PhD scholar has completed all the requirements for the award of the PhD degree.

b) A Copy of PhD Dissertation for including in PhD Country Directory and for attestation of the PhD degree by the HEC.

c) A duly filled Performa for the PhD Country Directory signed by the Principal Supervisor, Controller of Examination and the Vice Chancellor.

7.11 PMDC Requirements at completion of Degree:

All PG students after completing their PhD Anatomy degree shall be registered by the Council (PMDC policy 2023) **

7.12 Support and counselling of trainees:

The University in collaboration with the profession, will ensure that a system for support, counselling and career guidance of trainees. Counselling shall be provided based on monitoring the progress in training and program. (PMDC policy 2023)**

7.13 Leave Rules for scholars

Casual leave not exceeding 24 days per year shall be admissible. More than 10 days leave at one time shall not be allowed. Leave on medical grounds shall be admissible on production of medical certificate by the Medical Officer as per Punjab Medical Attendance Rules. However, if medical leave is continued and exceeds one month eg during pregnancy or lactation, the scholar is allowed to freeze that semester.

SECTION-VIII
PROGRAM RESOURCES

8.1 ANATOMY DEPARTMENT

Department of anatomy participate in the following degree programs and caters over 900 students.

- MBBS
- B.Sc and Allied Health Sciences
- Optometry
- Orthotics
- Doctor of physiotherapy(DPT)
- Medical Imaging Technology(MIT)

- Medical Laboratory Technology(MLT)
- Diploma in Cardiology

8.2 TEACHING ACTIVITIES

The department conducts lectures, tutorials, problem-based learning sessions and small group discussions. In addition, Histology practical sessions and cadaver dissection sessions are also conducted

8.3 Faculty:

Department of Anatomy is enriched with full-time dedicated, qualified and experienced faculty for teaching

RAWALPINDI MEDICAL UNIVERSITY

ANATOMY DEPARTMENT

Name of faculty member	Qualification	Designation
Dr. Saima Naz	MBBS, PhD (Anatomy) ,CHPE	Professor (PhD Supervisor)
Dr. Ayesha Yousaf	MBBS, M-Phil (Anatomy), CHPE	Professor (HOD)
Dr. Ifra Saeed	MBBS, M-Phil (Anatomy), CHPE	Professor (DME)
Dr. Mothashim Hina	MBBS, M-Phil (Anatomy), CHPE	Associate Professor
Arsalan Manzoor Mughal	MBBS , M-Phil (Anatomy),MHPE	Associate Professor
Dr. Maria Tasleem	MBBS , M-Phil (Anatomy) ,CHPE	Assistant Professor
Dr. Sumyyia Bashir	MBBS , FCPS (Anatomy) ,CHPE	Assistant Professor
Dr. Sadia Aman	MBBS, M-Phil (Anatomy), CHPE	Assistant Professor
Dr. Sara Bano	MBBS, M-Phil (Anatomy), CHPE	Assistant Professor
Dr. Tayyaba Qureshi	MBBS, M-Phil (Anatomy) ,CHPE	Assistant Professor
Dr. Minahil Haq	MBBS, M-Phil (Anatomy) ,CHPE	Demonstrator
Dr. Gaiti Ara Saeed	MBBS	APWMO
Dr. Sadia Baqir	MBBS	APWMO
Dr. Tariq Furqan	MBBS	Senior Demonstrator
Dr. Sajjad Hussain	MBBS	Senior Demonstrator
Dr. Zeneara Saqib	MBBS	Senior Demonstrator
Dr. Qurat ul Ain	MBBS	Senior Demonstrator
Dr. Ali Raza	MBBS	Demonstrator
Dr. Kashif Ashraf	MBBS	Demonstrator

8.4 Infrastructure:

The facilities present in Anatomy Department at RMU Campus include

- Chairperson's Room (HOD)01
- Professor's Room 02
- Associate Professor 's Room 02
- Assistant Professor's Room 01
- Female Staff Room 01
- Male Staff Room 01
- Conference Room 01
- Seminar Room 01
- Support Staff Room 01
- Departmental library
- Air-Conditioned Lecture halls with Audio Visual facility.
- One cadaver dissection hall and body preservation area.
- Histology Laboratory - fully equipped with over 50 microscopes with modern teaching facilities e.g. multimedia and microscope projection on LCD.
- Museum/Model Room – comprising a collection of anatomy models and carefully selected x-ray, CT and MRI films, 3 D projections on LCD which are available for student learning activities.
- Embalming services are also available in the department.
- Right now, Pathology laboratories (multi-disciplinary) in the attached teaching hospitals have basic as well as advanced facilities for the research work for PGs of RMU. Some of the advanced facilities available in our teaching hospital laboratories include:
  - PCR Laboratory

  Our under constructed postgraduates multipurpose University Post-graduate Research Complex includes laboratories for Anatomy, Physiology, Pharmacology, Forensic Medicine, Hematology, Chemical Pathology, Microbiology, Molecular Biology, Histopathology and skill laboratories. It's PC1 has been submitted to Higher Education Commission of Pakistan.

8.5 EQUIPMENT AVAILABLE IN DEPARTMENT

S No.	Item	Quantity
1.	Mortuary cooler	05
2.	Microphone	02
3.	Microphone neck	07
4.	Magazine round	01
5.	Microtome rotary	01
6.	Multimedia	03

7.	Overhead trolley	01
8.	Centrifuge	01
9.	Dissection Kocher	02
10.	Drum tab	01
11.	Split AC	01
12.	Water filter	01
13.	Animal weighing machine	01
14.	Projector lamp	10
15.	C.C.T.V camera	01
16.	Presenter	02
17.	Disposable knife holder	01
18.	BP apparatus	02
19.	Air conditioner split dissection Hall	06
20.	Weighing machine	02

21.	X-ray eliminator	04
22.	Trolley with stricture	01
23.	Shacking machine	01
24.	Stethoscope	02
25.	Projection screen	02
26.	Photostat machine	01
27.	Screen wall mounted	02
28.	Desert cooler	06
29.	Hot plate	01
30.	Tissue floating bath	01
31.	Examination coach	01
32.	Tissue processor	01

33.	Telephone set	04
34.	Tank specimen	05
35.	Slide projector	05
36.	UPS 1000 w	04
37.	Amplifier	03
38.	Speaker	12
39.	Knife microtome	02
40.	Incubator	01
41.	Slides 35mm	100
42.	Balance (electric)	01
	INSTRUMENTS	
	Bone cutting forceps	06
	Chasel postpartum	04
	Forceps 5 inch plane	37
	Forceps 3 inch brunt	40
	Brain box	21
	Hammer s.s	06
	Knife	06
	B.P handle	06
	Scissors s.s pointed	15
	Tray s.s 12x10x12	04
	Tray s.s 10x18x12	29
	Surgical scissors	29
	Specimen jars	200
	Saw postpartum	13

	Pointed forceps	24
	Frame	56

HISTOLOGY LABORATORY EQUIPMENT

S.no	Item	Quantity
1	Teaching microscope	01
2	Multi head microscope bx40	01
3	Photographic microscope	01
4	Binocular microscope two head	04
5	Stereo microscope	01
6	Binocular microscope Nikon	45
7	Student microscope	10
8	Binocular microscope 1007 China	06
9	Wooden cabinet	01
10	Slide box	30
11	Meter exposure	01
12	Condenser	06
13	Eye piece	10
14	Instrument cabinet	06
15	Stage micrometre	01

EQUIPMENT

ESSENTIAL FOR PhD Anatomy PROGRAMME

(Equipment)				
	Equipment	**Min Required**	**Deficiency**	**Remarks Working/ Not working**

	ELISA/RIA Apparatus	1	Nil	Working
	Fluorescent Microscope	1	Nil	Working
	PCR	1	Nil	Working
	Safety Hood	1	Nil	Working
	Gel Electrophoresis Apparatus	1	Nil	Working
	Gel Documentation System	1	----	----
	Centrifuge 4C0	1	Nil	Working

8.6 Facilities

Animal House: At RMU ;In process.

MOU signed with NIH

Library

- Available space including seating capacity: Eighty students
- Total No. of Books = More than 21 thousand
- Total Journals: 133 (Pakistani: 41 & Foreign: 92)

March 2023 onwards Digital library is accessible to all students & faculty (24 hours service via digital Library).

Books Available in the Library for Specialty

Name	Authors

Last Anatomy Regional and applied	RMH McMinn (Churchill Living stone)
Clinically Oriented Anatomy	Keith L. Moore (Lippincott, William and Wilkins)
Gray’s anatomy	William Et Al (Churchill Living stone)
The developing Human	Keith L. Moore (saunders0
Medical Embryology	Jan Langman (William and Wilkins)
Baily’s text book	Wilfred M. (coopenhaver, Kelly wood)
Functional histology	Bringer (Little brown and Co)
Histology: A text and an atlas	B. Young & H. Heath (Churchill Living stone)
Genetics in medicine	J.S Thompson & W.B Sauders (M.W. Thompson)
Human Neuroanatomy	J. Stuin& M.B Carpenter (William and Wilkins)
Clinical Neuroanatomy	Richard S. Snell (William and Wilkins)
Histochemistry theoretical and applied	Anthony Guy Everson. Pearse (Churchill Living stone)
Histopathologistictecnic and Prac. Histochemistry	Ralph Dougall, Lillie
Biological Micro technique	Sanderson J
Junqueira's Basic Histology: Text & Atlas	Anthony L. Mescher
Di Fiore's atlas of histology	Eroschenko
Developing Human: Clinically Oriented Embryology	Keith L. Moore
Ross, M.H. and Pawlina, W. Histology: A Text and Atlas, 6th ed	Lippincott, Williams
Netter Atlas of human Anatomy	Netter
Principles of anatomy and physiology	Jortora, Gerard (et al)
Anatomy and Physiology in health	Waugh, Anne (et .al)
Anatomy & Physiology in health & illness	Kathleen, J,W. Wilson.
Concepts of human Anatomy & Physiology	Graaf, Kent. M Van De (et al)

LIST OF JOURNALS

1.	British Journal of Anatomy	
2.	American Journal of anatomy	

3.	ActaAnatomica	
4.	Journal of Medical Genetics	
5.	The journal of bone & joint surgery	
6.	Journal of Anatomical science India	
7.	Annals of Saudi Medicine	
8.	Saudi journal of Kidney diseases & transplantation	
9.	Pakistan journal of medical research	
10.	Journal of the Pakistan Dental Association	
11.	Pakistan journal of medical sciences	
12.	Himont medical journal	
13.	Journal of the Pakistan medical association (centre)	
14.	Pakistan journal of pathology	
15.	Pakistan Armed Forces medical journal	
16.	Annals of Pakistan Institute of Medical science	
17.	The Pakistan journal of Gastroenterology	
18.	The journal of Baqai Medical university	

19.	British journal of obstetrics & gynaecology	
20.	Journal of surgery Pakistan	
21.	Rawal medical journal	
22.	The journal of bone & joint surgery	
23.	The British journal of surgery	

24.	Journal of Rawalpindi Medical college	
25.	BMJ books catalogue	
26.	AXIOM Innovation in intervention	
27.	The Professional	
28.	Anuals of KEMU	
29.	Annals of KEMU	
30.	Pakistan Journal of chest Medicine	
31.	Sultan Qaboos University Medical Journal	
32.	Pakistan journal of Medical Ethics	
33.	Pakistan oral & Dental Journal	
34.	Pakistan journal of Medical Education	
35.	Pakistan journal of Medical Research	
36.	International journal of Pathology	
37.	Journal of Ayub Medical College Abbottabad	
38.	Journal of Surgery Pakistan	
39.	Pakistan journal of Physiology.	
40.	Journal of the CPSP	

8.7 COURSE DETAILS OF PhD ANATOMY PROGRAM

By the end of the course work, the PhD Anatomy scholar must have acquired a reasonable working knowledge of

Cognitive Domain:

- Knowledge at the frontier of the field of Human Anatomy including knowledge that constitute an original contribution.
- Substantial knowledge of research principles and methods applicable to the field.
- An understanding of theoretical knowledge and to reflect critically on the theory and practice of Anatomy.
- Use of intellectual independence to think critically, evaluate existing ideas, undertake systematic investigation and reflect on theory and practice of Anatomy to generate original knowledge.

Psychomotor Domain

- Expert technical and creative skills applicable to the field of Anatomy.
- Expert skills to search, design, analyse and communicate research that makes a significant and original contribution to knowledge and/or professional practice of Anatomy.
- Communication skills to explain and critique theoretical propositions, methodologies and conclusions to communicate results to peer and the community.
- Communication skills to present a complex investigation of original research for external examination against international standards.

Affective Domain

- Intellectual independence.
- Initiative and creativity in new situations and/or for further Learning.
- Full responsibility and accountability for personal outputs
- Plan and execute original research (Project management)
- Life-long learner to generate new knowledge, in the context of professional practice effective medical teacher.

CORE COURSES (ANA 800)

ANA 801 -MUSCULOSKELETAL (CORE COURSE)

COURSE DESCRIPTION:

The anatomy of the musculoskeletal system is of paramount importance in research due to its fundamental role in human movement, stability, and overall health. Understanding the intricate structure of bones, muscles, joints, and connective tissues is essential for various areas of research.

LEARNING OBJECTIVES

Upon completion of course, the students should be able to:

1. Understand and interpret the gross structure of various parts of the body
2. Identify the bones, joints, muscles, nerves and blood vessels of the upper limb ,Lower limb, thorax, Head & neck
3. Assess the anatomy of common incisions
4. Apply the knowledge to solve clinical problems related to osteology & muscles of the body

COURSE CONTENT

S. NO	Topics
1	Osteology & Joints of upper limb with clinical anatomy
2	Osteology & Joints of lower limb with clinical anatomy
3	Osteology & Joints of Head & neck with clinical anatomy
4	Osteology & Joints of thorax with clinical anatomy
5	Flexor & Extensor compartment of arm & forearm with neurovascular bundle
6	All compartments of thigh & Leg with neurovascular bundle
7	Muscles & Neurovascular bundle of Maxillofacial region
8	Muscles & Neurovascular bundle of Thorax & Abdomen

ANA 802- Splanchnology /Viscerology (CORE COURSE)

COURSE DESCRIPTION:

The anatomy of Splanchnology/Viscerology is critical in research due to its focus on the internal organs, their structure, function, and interactions. This field plays a crucial role in understanding various diseases, developing treatments, and advancing surgical techniques. Overall, the anatomy of Splanchnology/Viscerology is essential for research in various fields. It provides a foundation for understanding the structure and function of internal organs, which is crucial for advancing our knowledge of health and disease.

COURSE OBJECTIVES

Upon completion of course the students should be able to:

1. Understand and interpret the gross structure of various parts of the body
2. Identify the viscera grossly & in cross sections of the body
3. Assess the anatomy of common incisions
4. Apply the knowledge to solve clinical problems related to Anatomy

COURSE CONTENTS:

The course contents will include:

S No.	Topics
1	Contents of mediastinum, Lungs, Bronchopulmonary segments
2	Pericardium, heart
3	Anterior abdominal wall(Rectus sheath), Posterior abdominal wall(Thoraco lumbar fascia), Peritoneal dispositions
4	Inguinal canal & hernia, external genitalia
5	Pharynx, Larynx Oesophagus, stomach
6	Small intestine, duodenum, ileum and jejunum
7	Large intestine and appendix, Rectum, Anal canal
8	Liver, Gall bladder and extra biliary apparatus
9	Pancreas, spleen
10	Kidney and supra renal and ureters, Urinary bladder, urethra , Prostate, Seminal vesicles, Vas deferens, ejaculatory duct
11	Pelvic peritoneum, pelvic diaphragm & Perineal pouches
12	Uterus, Uterine supports, Ovary, vagina, Ischio rectal fossa and
13	Thyroid and parathyroid gland
14	Tongue, Soft palate
15	Eyeball, Orbit wall and its content, Eye lid and lacrimal apparatus & Extra ocular muscles
16	Applied Anatomy, Radiograph & Surface marking

RECOMMENDED READINGS

1. Snell. R.S. Clinical Anatomy for Medical Students. Philadelphia USA Lippincot Williams and Wilkins: Latest Ed.
2. Sinnatamby C.S.Lasts Anatomy Regional and Applied London, Churchill Living Stone Latest Ed.
3. Williams, P.L. Bannister, L.H. Berry, M.B, Collins, P., Dyson M. Ferguson, M.WJ. Gray's Anatomy London. Churchill living stone: Latest Ed.
4. Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams and Wilkins: Latest

JOURNALS:

1. Journal of Anatomy
2. Anatomia, Histologia, Embryologia

ANA 803- MICROSCOPIC ANATOMY & LABORATORY TECHNIQUES (CORE COURSE)

COURSE DESCRIPTION:

Histology is an essential tool for understanding the function of different tissues and organs in the body. It allows researchers to study the structure and organization of tissues at a microscopic level. Histology is the cornerstone of diagnostic pathology, where it is used to identify and classify diseases based on the microscopic appearance of tissues. The goal of this course is to give the scholar a basic understanding of microscopic Anatomy and to equip them to undertake research in Histopathology.

COURSE OBJECTIVES

Upon completion of course the students should be able to:

1. Illustrate the microscopic structure of all the tissues and organs of the human body
2. Elaborate the functional correlation of the histological structure of clinically important tissues and organs
3. Describe the uses and applications of all types of microscopes.
4. Handle microscopes commonly used in research and histology labs

COURSE CONTENTS

S No	Topics
	Part-I (GENERAL HISTOLOGY)
1.	Introduction to different types of microscope
2.	Cell ,its organelles and cell junctions
3.	Epithelial tissue (classification & surface modifications)
4.	Connective Tissue (Cartilages; Bone, Bone marrow and blood cells)
5.	Muscular tissue
6.	Nervous tissue
7.	Lymphoid Organs
	Part-II (SPECIAL HISTOLOGY)
1.	Digestive system including associated glands
2.	Respiratory System
3.	Urinary System
4.	Reproductive System (Male & Female)

5.	Endocrine System
6.	Circulatory System
7.	Integumentary system
8.	Organs of Special Senses

RECOMMENDED READINGS:

1. Junqueira, L.C.Cameiro, J. Basic histology. California, U.S.A, Lange Medical publication: Latest Ed.
2. Kelly, D.E, Wood, R.L, Enders, A.C. Bailey's Text Book of Microscopic Anatomy. Baltimore, U.S.A, Williams and Wilkins: Latest Ed.
3. Burkit,H.G, Young, B, Heaith, J.W. Wheater's Functional histology London, Churchill living stone: Latest Ed.
4. Lesson, C, R, Lesson, T. S. Histology. Philadelphia .S.A, W. B. Saunders and Company Latest Ed.
5. Faucett, D.W.A Text Book of Histology. London, Chapman and hall: Latest Ed.
6. Williams, P.L.Bannister, L.H, Berry, M.B, Collins, P., Dysons M Ferguson, M.WJ. Gray's Anatomy .London, Churchill living stone: Latest Ed.

JOURNALS:

1. Clinical Anatomy
2. Archives of Histology and Cytology
3. International Journal of Developmental Biology
4. Anatomia, Histologia, Embryologia

Biosafety & Laboratory techniques

Basic laboratory techniques are fundamental for PhD scholars in various fields. PhD scholar is expected to conduct high level Lab experiments. These techniques provide the foundation for conducting experiments, collecting data, and advancing scientific knowledge. Basic lab techniques include knowledge of safety procedures and practices. PhD scholars must understand how to handle chemicals, biological materials, and equipment safely to protect themselves and others in the lab.

LEARNING OBJECTIVES:

By the end of the course, the PhD scholar should be able to

- Learn and apply basic laboratory safety rules and procedures to ensure personal and environmental safety.
- Become familiar with common laboratory equipment, such as microscopes, balances, pipettes, and microtomes, and understand their functions and proper usage.
- Develop basic laboratory skills, including pipetting, measuring volumes and masses, dilution techniques, and basic calculations.

- Learn proper techniques for handling and preparing various types of samples /sections.
- Understand the phenomenon of fixation, dehydration, clearing, embedding.
- Comprehend the knowledge of sectioning .
- Comprehend the knowledge of indications, procedures and correction of abnormal deviations of various staining methods.

COURSE CONTENTS:

The course contents will include:

S. NO	Topics
1.	Composition, advantages and disadvantages of common fixative
2.	Fixation of tissue
3.	Clearing agents
4.	Paraffin Embedding process
5.	Sectioning Process ,freezing sections of fresh tissues
6.	Microtomes and knives, their types and uses
7.	Staining Procedure: uses and interpretation of Routine Haematoxylin and Eosin, Cresyl Violet for Nissl substance, Sudan Black B for Lipids, Mallory's connective tissue stain, Gomor's Aldehyde Fuchsin Stain for pancreas, Feulgen method for DNA, Periodic Acid Schiff (PAS) for glycogen, Modified Halmi's method for Pituitary gland, Some latest techniques.
8.	Mounting; Vital and supravital dyes and study of cell
9.	Microscopes; Components, phenomenon and uses of Simple and compound optical microscopes, Florescent microscope, Polarizing microscope, Dark field microscope, Electron microscope; Micrometry; Microphotography; Maintenance of microscopes.

RECOMMENDED READINGS

1. Biological micro technique by Sanderson
2. Handbook of basic micro technique
3. Animal micrology
4. Micro technique by Bancroft

JOURNALS

1. Botanical micro technique

ANA 804- DEVELOPMENTAL ANATOMY/ EMBRYOLOGY (CORE COURSE)

COURSE DESCRIPTION:

Research in embryology is crucial for understanding the processes that govern development, including cell differentiation, tissue formation, and organogenesis. Embryology plays a key role in stem cell research, which explores the potential of stem cells to develop into different cell types. By understanding the factors that control stem cell fate during embryonic development, researchers can better harness the therapeutic potential of stem cells. The goal of this course to give the scholar a basic understanding of human development & to equip them to undertake research in embryology.

COURSE OBJECTIVES:

Upon completion of course, the students should be able to:

1.Describe and interpret general aspects of normal human development
2.Identify critical periods of growth
3.Discuss the development of all systems of body
4.Discuss the mechanism, pathogenesis and clinical aspects of common congenital anomalies
5.Discuss the mechanism through which various environmental agents can affect these developmental processes
6. Discuss Various diagnostic procedures which can be used to assess fetal well being
7.Elaborate methods of In Vitro Fertilization and Cloning

COURSE CONTENTS (DEVELOPMENTAL ANATOMY)

The course contents will include:

Part I (GENERAL EMBRYOLOGY)

S No.	Topics
1.	Various terms of life span, Cell cycle, cell division & chromosomal abnormalities
2.	Gametogenesis (Oogenesis & spermatogenesis)
3.	Fertilization, Implantation, ectopic Pregnancies, contraception, IVF & Cloning including religious and legal aspects
4.	Reproductive cycles
5.	Embryonic period (Organogenesis)
6.	Fetal period, Fetal membranes & Placenta
7.	Parturition & Multiple pregnancies
8.	Birth defects & pre-natal diagnosis
	Part II (SPECIAL EMBRYOLOGY)
1.	Development of Musculoskeletal system
2.	Body Cavities, Mesenteries and Diaphragm
3.	Development of Cardiovascular System
4.	Development of Respiratory System

5.	Development of Digestive System
6.	Development of Urogenital System
7.	Development of Head& Neck and pharyngeal apparatus
8.	Development of Nervous System
9.	Development of Eye & Ear

RECOMMENDED READINGS

1. Moore and Persuad. The Developing Human. Philadelphia, U.S.A, W.B. Saunders and company, Latest Ed.
2. Saddler T.W. Langman's Medical Embryology. Philadelphia, U.S.A, Lippincott Williams & Wilkins, Latest Ed.
3. Williams, P.L. Bannister, L.H, Berry, M.B, Collins, P, Dyson M, Ferguson, M.W.J. Gray's Anatomy. London, Churchill Living stone: Latest Ed.

JOURNALS

1. Congenital Anomalies
2. Anatomy and Embryology
3. Mechanisms of Development
4. Anatomia, Histologia, Embryologia
5. Development, Growth and Differentiation
6. International Journal of Developmental Biology
7. Birth Defects Research Part A: Clinical and Molecular Teratology
8. Birth Defects Research Part A: Developmental and Reproductive
9. Toxicology

ANA 805- NEUROANATOMY (CORE COURSE)

COURSE DESCRIPTION:

Neuroanatomy is a fascinating field that involves the study of the structure and function of the nervous system. Research in neuroanatomy covers a wide range of topics, from basic anatomical studies of the nervous system to more complex investigations into neurological disorders and brain function. Researchers in this field use various techniques, such as neuroimaging, histology, and molecular biology, to explore the structure and function of the nervous system at different levels of organization.

COURSE OBJECTIVES

At the end of the course the student should be able to

1. Describe the gross and internal structure of various components of the nervous system including tracts and connections
2. Co-relate the anatomical knowledge of the nervous system with functions
3. Discuss the cross-sectional anatomy of various parts of the central nervous system.
4. Describe basic knowledge of common lesions and diseases related to the nervous system
5. Explain formation, circulation and importance of CSF

6.Appreciate neuronal connections of different parts of CNS
7.Discuss blood supply of different parts of brain and spinal cord
8.Describe applied anatomy of CNS

COURSE CONTENTS:

The course contents will include:

	TOPICS
	Meninges, Cisterns, Dural venous sinuses
	Spinal cord (Ascending & Descending tracts)
	Base of brain, Circles of willis, Blood supply of brain and venous drainage
	Medulla oblongata, Pons & Cerebellum
	Mid Brain Diencephalon (Thalamus, hypothalamus), Basal Ganglia
	Lateral ventricle ,4^{th} ventricle, 3^{rd} ventricle & Circulation of C.S.F
	Cerebral hemisphere(sulci, gyri, cortical areas)& White matter of cerebrum
	Cranial nerve nuclei & nerves
	Reticular formation & Limbic system
	Applied Anatomy

RECOMMENDED READINGS

1. Carpenter. M.B. Text book of Neuroanatomy. Baltimore, U.S.A, Williams and Wilkins: Latest Ed.
2. Snell. R.S. Clinical Neuroanatomy for Medical Students. Philadelphia, U.S.A. Lippincott Williams and Wilkins: Latest Ed.
3. Williams, P.L. Bannister, LH, Berry, M.B, Collins, P. Dyson M, Ferguson, M.WJ.
4. Grays Anatomy. London, Churchill Living Stone: Latest Ed.

JOURNALS:

1. Muscle and Nerve
2. Mechanisms of Development
3. Anatomia, Histologia, Embryologia
4. Development Growth and Differentiation
5. International Journal of Developmental Biology

COMMON COMPULSORY COURSES (For All Specialties)

1.RESEARCH METHODOLOGY & MEDICAL WRITING

COURSE DESCRIPTION:

Research Methodology is a hands-on course designed to impart education in the foundational methods and techniques of academic research in social sciences and business management context. Research scholars would examine and be practically exposed to the main components of a research framework i.e., problem definition, research design, data collection, ethical issues in research, report writing, and presentation. Once equipped with this knowledge, students would be well placed to conduct disciplined research under supervision in an area of their choosing.

COURSE OBJECTIVES:

The primary objective of this course is to develop a research orientation among the scholars and to acquaint them with fundamentals of research methods. Specifically, the course aims at introducing them to the basic concepts used in research and to scientific social research methods and their approach. It includes discussions on sampling techniques, research designs and techniques of analysis. At the end of the course the students should be able to

1. To develop the basic framework of research process
2. To develop an understanding of various research designs and techniques
3. Identify various sources of information for literature review and data collection
4. Elaborate ethical dimensions of conducting applied research
5. Appreciate the components of scholarly writing and evaluate its quality.

COURSE CONTENT

S No	TOPIC
1.	Introduction to research – The role of research, research process overview
2.	Problems and Hypotheses – Defining the research problem, Formulation of the research hypotheses, The importance of problems and hypotheses
3.	Research design – Experimental and Non experimental research design, Field research, and Survey research
4.	Methods of data collection – Secondary data Collection methods, qualitative methods of data collection, and Survey methods of data collection
5.	Attitude measurement and scaling – Types of measurement scales; Questionnaire designing – Reliability and Validity

6.	Sampling techniques – The nature of sampling, Probability sampling design, Non-probability sampling design, Determination of sample size
7.	Processing and analysis of data & knowing Ethical issues in conducting research
8.	Report generation, report writing – Title page, Abstract, Introduction, Methodology, Results, Discussion, References, and Appendices

2.BIO STATISTICS & EPIDEMIOLOGY

COURSE OBJECTIVES

Upon completion of course the students will be able to comprehend basic knowledge of epidemiology and will be able to:

1. Define epidemiology and know the principles of various study designs
2. Know how to design a study and describe the validity and reliability of a study design
3. Know the fundamental concepts and methods of statistics in the areas of medical and biological research
4. Have good command on use of statistical computer software for data analysis
5. Approaches for data analysis, Parametric, non-parametric and Semi-parametric methods, Qualitative Methodologies and Interpretation of results, validity of conclusions.
6. Identify and prioritize research problems with literature review.
7. Formulation of research objectives
8. Learn Data collection techniques and sampling, planning for data collection, collation and analysis.
9. Planning for pilot study followed by main study along with Budget making and plan for dissemination.
10. Identify and define the basic concepts and procedures required for data analysis and interpretation.
11. Analyse and interpret the data collected for the research project and draw conclusions related to the objectives of your study.

12. Write a clear and concise research report (paper for a peer reviewed journal) and a summary of the major findings and recommendations for each of the different parties interested in the results.
13. Present the major findings and the recommendations of your study to policy-makers managers and to the subjects of your research together with them to finalize the recommendations.
14. Prepare a plan of action for the dissemination, communication and utilization of the findings and (if required) make recommendations for additional research.

COURSE CONTENTS:

S No.	Topics
1.	Descriptive epidemiology, analytic epidemiology and epidemiological inference
2.	Classification, morbidity and mortality rates, ratios, incidence, prevalence, sampling, screening, epidemiological models
3.	Types of study design; their importance, uses, and limitations, field trials, controlled epidemiological surveys, sources of bias and causal model
4.	Introduction to statistics, types of statistical applications, population and samples, data analysis and presentation, variables, elementary statistical methods, tabulation, chart and diagram preparations, measures of central tendency and dispersion, sampling techniques and sample size estimation, probability and proportions
5.	Tests of significance; normal test, t test, Chi square test etc, correlation and its applications, linear regression and multiple regression, Clinical trials and intervention studies
6.	Measures for developing health statistical indicators: morbidity and mortality statistics, Use of latest statistical computer software for data analysis

RECOMMENDED READINGS:

1. Gordis, L. Epidemiology. Pennsylvania: W.B. Saunders Company. Latest Ed.
2. Rothman KJ. Modern Epidemiology. Boston: Little, Brown and Company, Latest Ed.
3. Kelsey JL, Thompson WD, Evans AS. Methods in Observational Epidemiology. New York: Oxford UniversityPress, Latest Ed.
4. Kleinbaum DG, Kupper LL, Morgenstern H. Epidemiologic Research: Principles and Quantitative Methods.Belmont, CA: Lifetime Learning Publications, Latest Ed.
5. Lilienfeld DE, Stolley PD. Foundations of Epidemiology. New York: Oxford, Latest Ed.
6. Daniel WW. Biostatistics: A Foundation for Analysis in the Health Sciences. Latest Ed. John Wiley & Sons.Inc. New York.
7. Larson R and Farber B. Elementary Statistics: Picturing the World. Latest Ed, Prentice Hall Publications.NewJersey USA.
8. Oliver, M. and Combard MS. Biostatistics for Health Professions. Latest Ed. Prentice Hall Publications, NewJersey USA.
9. Statistical Software: SPSS; EPIINFO; STATA; SAS
10. Material provided as Health Services Course

JOURNALS:

1. Cancer Epidemiology
2. Epidemiologic Reviews
3. Annals of Epidemiology
4. American Journal of Epidemiology
5. International Journal of Epidemiology

3.ADVANCES IN MOLECULAR BIOLOGY & BIOINFORMATICS

COURSE DESCRIPTION OF MOLECULAR BIOLOGY:

A course in molecular biology typically covers the study of biological processes at the molecular level, focusing on the structure and function of biomolecules such as DNA, RNA, proteins, and lipids. The course usually includes topics such as:

Nucleic Acids: The structure and function of DNA and RNA, including replication, transcription, and translation processes, as well as the role of nucleic acids in inheritance and gene expression.

Genetics: The principles of inheritance, including Mendelian genetics, genetic variation, and the molecular basis of genetic disorders.

Gene Expression: The regulation of gene expression, including the mechanisms of transcriptional and posttranscriptional control, and the role of epigenetics in gene regulation.

Protein Structure and Function: The structure and function of proteins, including protein synthesis, folding, and post-translational modifications, as well as the role of proteins in cellular processes and signaling pathways. **Recombinant DNA Technology:** Techniques used in molecular biology research, such as cloning, PCR (polymerase chain reaction), DNA sequencing, and genetic engineering.

Genomics and Proteomics: The study of entire genomes and proteomes, including genome sequencing, annotation, and comparative genomics.

Molecular Evolution: The processes of molecular evolution, including genetic variation, mutation.

Applications of Molecular Biology: The practical applications of molecular biology in fields such as medicine & Biotechnology.

Ethical and Social Issues: The ethical, legal, and social implications of advances in molecular biology, including issues related to genetic testing, gene therapy, and biotechnology.

Laboratory techniques

The course may also include laboratory work to provide hands-on experience with molecular biology techniques and experiments. It provides a basis for understanding the molecular basis of life and the applications of molecular biology in various scientific disciplines.

- PCR
- Gel electrophoresis
- Restriction fragment length polymorphism (RFLP)
- Blotting Techniques (Sothern, Western and Northern Blotting)

Bioinformatics

COURSE DESCRIPTION

- This course introduces fundamental concepts and methods for bioinformatics and the advanced applications. Topics covered include
- Bioinformatics database
- Sequence and Structure alignments
- Protein folding and Protein structure prediction

LEARNING OBJECTIVES

- Learn about bioinformatics and gain understanding of lab and research techniques using molecular biology methods.
- Understand the error, limitations, and costs/sample for each technology.
- Understand methods for producing and using SNP arrays , Compare and contrast exome sequencing to whole genome and SNP sequencing, including their limitations
- Gain familiarity with computational methods in order to address problems in molecular biology.
- Become knowledgeable about the storage, retrieval, sharing and use of biological data, information, and tools

COURSE CONTENTS:

- Gene ontology and gene annotations
- Databases of human genes
- Gene Expression Patterns
- Profiling of micro RNA mRNA Proteins and disease genes by various Browsers
- Statistical correlations between Entities in a Database,
- Utilization and exploitation of NCBI, UCSC, ENSEMBL and BioGPS genomic browsers in Genomics and Proteomics research.

RECOMMENDED READINGS:

- Evolutionary Computation in Bioinformatics Fogel, G.B. and Corne, D.W.
- Pierre Baldi and Soren Brunak, Bioinformatics: The Machine Learning Approach.
- Introduction to Bioinformatics. (A Theoretical and Practical Approach). A. Krawetz and D. Womble. 2002.
- Introduction to Bioinformatics. Lesk, A.M. 2002 Oxford University Press. A collection of relevant review and research articles will also be distributed in class as required reading

4.HEALTH PROFESSIONAL EDUCATION & MEDICAL ETHICS

COURSE DESCRIPTION of MEDICAL ETHICS

The ethics curriculum is designed to provide students with the conceptual tools that they will need to navigate the ethical issues that are commonly encountered in clinical practice. Program helps students to develop skills in critical reasoning and in using the basic concepts of medical ethics it also fosters the habits of critical reflection and discussion about the ethical issues. Thorough exploration of ethics is critical to developing exemplary scholars and teachers. Focusing on discussion, curriculum considers central ethical and legal principles, and research ethics.

LEARNING OBJECTIVES

At the end of the course the student should be able to

- Describe student professionalism, codes of ethics & importance of truth telling
- Discuss ethical dangers of human subject research
- Describe concepts of autonomy
- Explain justice in clinical practice, Confidentiality, legal responsibility, Adherence and compliance
- Understand ethical issues regarding handling of research animals
- Exhibit attitude towards research on human volunteers, experimental animals and ethical aspects

COURSE CONTENT

S no.	Topic
1.	Professional Responsibilities ➢ Student Responsibilities/ Professionalism ➢ Qualities of a Physician/Codes of Ethics ➢ Should Patients Be Learning Tools
2.	Central Ethical & Legal Principles ➢ Duty to Provide Care (Trust & Fiduciary Responsibility) ➢ Truth Telling and Informed Consent for Treatment ➢ Confidentiality and The Duty to Warn
3.	Research Ethics [Epidemiology] ➢ Ethical Dangers of Human Subject Research ➢ The Importance of Research and The Development of New Therapies ➢ The Common Rule: Requirements for The Ethical Conduct of Research
4.	Justice and Medicine ➢ Justice in Clinical Practice ➢ The Right to Health Care ➢ Allocation of Transplant Organs
5.	The Nature and Value of Autonomy ➢ Concepts of Autonomy ➢ Concept of beneficence ➢ Concept of non-maleficence ➢ Standards for Surrogate Decision Making ➢ Refusal of Treatment and Justified Paternalism ➢ Advance Directives and Proxies

6.	Animal Handling Research ethics ➢ Reproduction and fertility ➢ Genetics and the human future ➢ Animal rights in experimentation ➢ Animal preparation and experiments of laboratory animals ➢ Maintenance of animal house. ➢ Routine physiology experiments on animals and humans

RECOMMENDED READINGS

- Beauchamp, J. (2013). "Principles of Biomedical Ethics".
- Principles of Biomedical Ethics.
- World Medical Association. http://www.wma.net.
  Principal features of medical ethics [archived 4 March 2016; Retrieved 3 November 2015].

JOURNALS

- British Medical Journal.
- The Medical Journal of Australia

HEALTH PROFESSIONAL EDUCATION

Course Goal:

The course is endeavours to train post graduate students (basic medical sciences) in basics of health profession education to produce competent health profession teacher

Outcomes of Course:

By the end of the course the students will be able to:

- Adept in basic knowledge and its application in the core areas of medical education i.e. educational environment & students, teaching and learning, curriculum development including educational strategies & curriculum themes, Students assessment and Program evaluation.
- Acquire knowledge, skills and attitude requires for a competent health profession educator by understanding & applying the theoretical and empirical literature in medical education

- Critically examine the preparation requires for their role as educators of their profession through enhancing students understanding and implementation of principles of adult learning and teaching in relation to their target group.
- Apply the educational theories and cognitive psychology in support of their role as an educator in practice.
- Use knowledge and skills require for Designing & developing an integrated curriculum/Module at an undergraduate level.
- Understand and apply the fundamentals of educational methodologies (Learning and Teaching) while "Teaching to learn and learning to teach".
- Understand and apply the fundamental principles in 'Assessment' while designing an assessment plan and assessment tools.
- Design a plan with tools for evaluating a teaching program.
- Demonstrate effective communication skills (active participation, Pro-activeness, professionalism, group dynamics, team building, conflict resolution, negotiation skills, leadership skills etc) while working in the group/team tasks.

Course Overview :

The whole course is based on principles of constructive cognitive philosophy and follows the FAIR criteria to improve learning. According to constructive philosophy the teacher is more than a transmitter of information and has responsibility for managing the student's learning. The reflective teacher understands the principles of learning. Hence, this course has four key features identified for effective learning – the FAIR criteria:

F	**F**eedback to the learner as to progress
A	**A**ctive rather than passive learning
I	**I**nterest or motivation of the learner
R	**R**elevance to the perceived and real needs of the learner

This course is designed for the post gradates medical students to develop them as an effective team member and effective teacher in an Integrated Curriculum development, its implementation and evaluation. The students will understand and apply the basic core concepts in medical education while working as Task Force member, conducting an integrated session for instance 'Problem based Learning Sessions' etc and assessing the students.

COURSE CONTENT

The essential Core area in medical education in which students will be trained are;

1) Educational environment & students

2) Teaching and learning strategies

3) Curriculum development including educational strategies & curriculum themes,

4) Students' assessment

5) Program evaluation

Learning Resources:

- A practical Guide for Medical Teacher by John A. Dent & Ronald M. Harden. (4th edition, A Book)
- Journal Articles will be provided from the latest medical education journals.
- Other reading materials from the renowned author's books and research work, some good websites.

Mandatory Workshops/Conferences

COMPUTER SKILLS (TEACHING STRATEGY – HANDS ON WORKSHOP)

COURSE OBJECTIVES:

Upon completion of course the students will be able to:

1. Develop basic skills in operating computer in the mentioned softwares.
2. Comprehend the basic principles of presenting scientific data at national and international platforms using computer and IT technology

COURSE CONTENTS:

The course contents will include:

Programme Microsoft:

- Word
- Power point
- Excel

RECOMMENDED READINGS:

1. Hochreiter, Sepp; Wagner, Roland. Bioinformatics Research and Development. Series Lecture notes in Computer Science, Springer, Latest Ed.
2. Mandoiu, Ion; Narasimhan, Giri; Zhang, Yanqing. Bioinformatics Research and Applications Series: Lecture Notes in Computer Science. Springer, Latest Ed

JOURNALS:

1. Journal of Bioinformatics and Computational Biology (JBCB)
2. BMC Bioinformatics

Journal Club

Course Objectives:

Upon completion of the course the students will be able to:

1. Collect information from the available resources
2. Prepare a presentation on a given topic
3. To read and critique published research articles
4. Present research findings on a forum
5. Write literature review with proper internet search and references
6. Work as a Reviewer

Course Contents:

- The student will attend regular Journal Club Meetings and actively participate with presentations , lectures, discussions, and question-answer sessions;
- The student will prepare all the necessary back ground information, meaning of scientific terminology,
  methodology used, statistical tests applied and discussion.
- He/she will also discuss limitations of the study.
- The audience including faculty and students will ask questions

Resources:

1. Internet
2. Libraries
3. Peer Advice

Program Objective Assessment:

How Measured	When Measured
Employer Survey + Faculty Survey + Student Survey	After completion of each semester

SOURCES/ REFERENCES:

* https://www.hec.gov.pk/english/services/faculty/Plagiarism/Documents/HEC-PhD-Policy.pdf

** https://pmdc.pk/Documents/law/Approved%20PG%20regulations%202023.pdf

*** https://www.hec.gov.pk › universities › pqf › National Qualifications Framework of Pakistan

Proforma

Faculty Course Review Report

(To be filled by each teacher at the time of Course Completion)

Part-I

Department:			**Faculty:**		
Course Code:		**Title:**			
Batch:		**Term:**		**Year:**	
Credit / Contract hr/Week:	**Th**	**Pr**	**No. of Lectures Conducted**	**Th**	**Pr**
Name of Course Teacher			**No. of Students enrolled**		
Designation					

Assessment Methods please give precise details (no & length of assignments, tests and presentations)	

Comments: _____

_____

_____

Overview/ Evaluation (Course Co-coordinator's Comments)

Feedback: first summarize, and then comment on feedback received form:

1) Student (Course Evaluation) Questionnaires (filled by QEC)

2) External Examiners or Moderators (if any)
(comments of External examiner if any)

3) Curriculum: comment on the continuing appropriateness of the Course curriculum in relation to the intended learning outcomes (course objectives) and its compliance with the HEC Approved / Revised National Curriculum Guidelines **(comments by the course teacher)**

4) Assessment: comment on the continuing effectiveness of method(s) of assessment in relation to the intended learning outcomes (Course objectives)
(comments by the course teacher)

5) Enhancement: comment on the implementation of changes proposed in earlier Faculty Course Review Reports **(comments by the course teacher)**

6) Outline: any changes in the future delivery or structure of the Course that this semester/term's experience may prompt **(by the course teacher)**
Name/ Signature _____ Date_____ **(Course Instructor)** **Name/ Signature _____ Date_____** **(Head of Department)**

PGT EVALUATION BY STUDENTS

Teacher Evaluation Form

(To be filled by the student)

Course Title and Number: _____
Name of Instructor: _____ Semester _____
Department: _____ Degree _____

Use the scale to answer the following questions below and make comments

A: Strongly Agree B: Agree C: Uncertain D: Disagree E: Strongly Disagree

Instructor:					
1. The Instructor is prepared for each class	A	B	C	D	E
2. The Instructor demonstrates knowledge of the subject	A	B	C	D	E
3. The Instructor has completed the whole course	A	B	C	D	E
4. The Instructor provides additional material apart from the textbook	A	B	C	D	E
5. The Instructor gives citations regarding current situations with reference to Pakistani context.	A	B	C	D	E
6. The Instructor communicates the subject matter effectively	A	B	C	D	E
7. The Instructor shows respect towards students and encourages class participation	A	B	C	D	E

8. The Instructor maintains an environment that is conducive to learning	A	B	C	D	E
9. The Instructor arrives on time	A	B	C	D	E
10. The Instructor leaves on time	A	B	C	D	E
11. The Instructor is fair in examination	A	B	C	D	E
12. The Instructor returns the graded scripts etc, in a reasonable amount of time	A	B	C	D	E
13. The Instructor was available during the specified office hours and for after class consultations	A	B	C	D	E
Course:					
14. The Subject matter presented in the course has increased your knowledge of the subject	A	B	C	D	E
15. The syllabus clearly states course objectives requirements, procedures and grading criteria	A	B	C	D	E
16. The course integrates theoretical course concepts with real-world applications	A	B	C	D	E
17. The assignments and exams covered the materials presented in the course	A	B	C	D	E
18. The course material is modern and updated	A	B	C	D	E

Comments:
Instructor:_____
_____
_____

Course:_____
_____
_____

Faculty Course review report

Grades secured and other outcomes (to be provided by controller of Examination)

Name of Teacher:	**Course Taught**		**Term:**	
Session / Batch:	**Date of completion of term.**			

Flow Chart for PhD Scholars of RMU

Admission as per HEC/PMDC/RMU PhD Policy

⬇

Admission Documentation in Respective Department

⬇

Approval of Admission Dean's office/BASAR/Vice Chancellor

⬇

Issuance of Registration No. in Registrar Office and Display of List of Registered Candidates

⬇

Allocation of Academic Advisor/Supervisor/Co-Supervisor for each Candidate

⬇

Academic and Research Supervisory Committee for each Candidate

⬇

Start of Academic and Research Activities

⬇

S #	Academic Activity	Research Activity*
Semester 01	• Course work (9-12 CHrs) • Mid-Semester/End-Semester Exams (GPA ≥2.5 in each course and GPA ≥3.0/4.0 in Semester mandatory)	• Research Topic Finalization and approval from Departmental Academic and Research Supervisory Committee
Semester 02	Course work (9-12 CHrs) Mid-Semester/End-Semester Exams (GPA ≥2.5 in each course and GPA ≥3.0/4.0 in Semester mandatory) Passing Comprehensive Exam (60% pass marks)	Synopsis Writing and Approval from RB and BASAR Arrangement for Research Funding
Semester 03	Workshops Conferences Visits/Training in other Institutions	• Start of Research including pilot study • Phase I: up to 30% of Research) ○ Procurement of Required materials ○ Sample Collection and Processing
Semester 04	• Workshops • Conferences • Visits/Training/Collaboration in other Institutions	• Phase II: up to 70% of Research) • Sample Collection and Processing • Experimental Work • Data Collection and organization
Semester 05	• Collaborative work in other Departments/Institutions • Preparation of Research Publication	• Phase III: Completion of Research • Experimental Work • Data Collection and organization • Data Analysis
Semester 06	Research Publication	□ Thesis Writing and submission

***Note:** The given research model is as per facilitation from the Supervisor, Department and the University

Trainees/students will be informed about their assignments/duties by putting their duty rosters and teaching schedules on Campus management system of RMU

- By keeping academic log books
- By maintaining and displaying annual academic calendars
- All schedules will be readily available on college website

RMU Grading System

It will be based on GPA – 4 system

Marks obtained in Percentage range	Numerical Grade	Alphabetical Grade
80-	4.0	**A+**
75-	4.0	**A**
70-	3.7	**A-**
67-	3.3	**B+**
63-	3.0	**B**
60-	2.7	**B-**
56-	2.3	**C+**
50-	2.0	**C**
<50 Un-grade-able	0	**U**

A candidate obtaining GPA less than 2.00 (50%) is declared un-graded (fail).

Cumulative transcript is issued at the end of clearance of each semester.

Plagiarism Policy

1. All RMU submissions are screened for plagiarism using "Turnitin" as per Higher Education Commission of Pakistan (HEC) policy
2. Similarity Index by Turnitin must be <19%, and from a single source, it must be <5%.
3. Plagiarism, data fabrication, and image manipulation is not acceptable.
4. Plagiarism includes copying text, ideas, images, or data from another source, even from your own publications, without giving any credit to the original source.

5. Reuse of text that is copied from another source must be between quotes and the original source must be cited. If a study's design or the manuscript's structure or language has been inspired by previous works, these works must be explicitly cited.
6. If plagiarism is detected during the peer review process, the manuscript may be rejected. If plagiarism is detected after publication, we may publish a correction or retract the paper.
7. Image files must not be manipulated or adjusted in any way that could lead to misinterpretation of the information provided by the original image.
8. Irregular manipulation includes: 1) introduction, enhancement, moving, or removing features from the original image; 2) grouping of images that should obviously be presented separately (e.g., from different parts of the same image, or from different image); or 3) modifying the contrast, brightness or color balance to obscure, eliminate or enhance some information.
9. If irregular image manipulation is identified and confirmed during the peer review process, we may reject the manuscript. If irregular image manipulation is identified and confirmed after publication, we may correct or retract the paper.
10. Any allegations of publication misconduct will be investigated by JRMC Editorial Staff who may contact the authors' institutions, funders, appropriate bodies if necessary. If evidence of misconduct is found, appropriate action will be taken to correct or retract the publication.

Research and Publication Ethics

I. We follow Code of Ethics and Best Practice Guidelines for Journal Editors detailed in COPE Research Publication Ethics

Research Ethics

I. Research Involving Human Subjects:

a. When reporting on research that involves human subjects, human material, human tissues, or human data, authors must declare that the investigations were carried out following the rules of the Declaration of Helsinki of 1975, revised in 2008. According to point 23 of this declaration, an approval from an ethics committee should have been obtained before undertaking the research. At a minimum, a statement including the project identification code, date of approval, and name of the ethics committee or institutional review board should be cited in the Methods Section of the article. Data relating to individual participants must be described in detail, but private information identifying participants need not be included unless the identifiable materials are of relevance to the research (for example, photographs of participants' faces that show a particular symptom). Editors reserve the right to reject any submission that does not meet these requirements.

b. Example of an ethical statement: "All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of XXX (Project identification code)."

c. A written informed consent for publication must be obtained from participating patients who can be identified (including by the patients themselves). Patients' initials or other personal identifiers must not appear in an image. For manuscripts that include any case details, personal information, and/or images of patients, authors must obtain signed informed consent from patients (or their relatives/guardians) before submitting to our journal. Patient details must be anonymized as far as possible, e.g., do not mention specific age, ethnicity, or occupation where they are not relevant to the conclusions.

d. You may compete the Ethical Declaration Form after consulting with your affiliated institution. Alternatively, you may provide a detailed justification of why informed consent is not necessary. For the purposes of publishing in JRMC, a consent, permission, or release form should include unlimited permission for publication in all formats (including print, electronic, and online), in sublicensed and reprinted versions (including translations and derived works), and in other works and products under open access license. To respect patients' and any other individual's privacy, please do not send signed forms. The journal reserves the right to ask authors to provide signed forms if necessary.