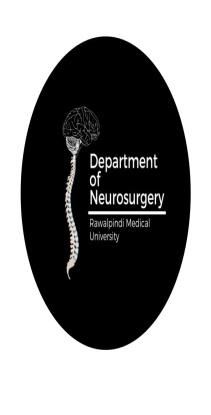
**RAWALPINDI MEDICAL UNIVERSITY**



Curriculum

**Masters in Neurosurgery (M.S)**



# PREFACE

The horizons of *Medical Education* are widening & there has been a steady rise of global interest in *Post Graduate Medical Education*, an increased awareness of the necessity for experience in education skills for all healthcare professionals and the need for some formal recognition of postgraduate training in Neurosurgery.

We are seeing a rise in the uptake of places on postgraduate courses in medical education, more frequent issues of medical education journals and the further development of e-journals and other new online resources. There is therefore a need to provide active support in *Post Graduate Medical Education* for a larger, national group of colleagues in all specialties and at all stages of their personal professional development. If we were to formulate a statement of intent to explain the purpose of this curriculum we might simply say that our aim is to help clinical colleagues to teach and to help students to learn in a better and advanced way. This book is a state of the art book with representation of all activities of the MS Neurosurgery program at RMU. Curriculum is incorporated in the book for convenience of supervisors and residents. MS curriculum is based on six Core Competencies of ACGME ***(Accreditation Council for Graduate Medical Education)*** including ***Patient Care, Medical Knowledge, System Based Practice, Practice Based Learning, Professionalism, Interpersonal and Communication Skills***. The mission of Rawalpindi Medical University is to improve the health of the communities and we serve through education, biomedical research and health care. As an integral part of this mission, importance of research culture and establishment of a comprehensive research structure and research curriculum for the residents has been formulated and provided in this book.

[***Prof. Muhammad Umar***https://www.rmur.edu.pk/](https://www.rmur.edu.pk/)

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# **SECTION- I PREAMBLE**

***MISSION STATEMENT***

The mission of MS Neurosurgery Residency Program of Rawalpindi Medical University is:

1. To provide exemplary neurosurgical care, treating all patients who come before us with uncompromising dedication and skill.
2. To set and pursue the highest goals for ourselves as we learn the science, craft, and art of surgery.
3. To passionately teach our junior colleagues and students as we have been taught by those who preceded us.
4. To treat our colleagues and hospital staff with kindness, respect, generosity of spirit, and patience.
5. To foster the excellence and well-being of our residency program by generously offering our time, talent, and energy on its behalf.
6. To support and contribute to the research mission of our neurosurgical center, nation, and the world by pursuing new knowledge, whether at the bench or bedside.
7. To promote the translation of the latest scientific knowledge to the bedside to improve our understanding of disease pathogenesis and ensure that all patients receive the most scientifically appropriate and up to date care.
8. To promote responsible stewardship of neurosurgical resources by wisely selecting diagnostic tests and treatments, recognizing that our individual decisions impact not just our own patients, but patients everywhere.
9. To promote social justice by advocating for equitable health care, without regard to race, gender, sexual orientation, social status, or ability to pay.
10. To extend our talents outside the walls of our hospitals and clinics, to promote the health and well-being of communities, locally, nationally, and internationally.
11. To serve as proud ambassadors for the mission of the Rawalpindi Medical University MS Neurosurgery Residency Program for the remainder of our professional lives.

***STATUTES***

1. ***Nomenclature:***

Nomenclature of the Proposed Course The name of degree programme shall be **MS Neurosurgery**. This name is well recognized and established for the last many decades worldwide.

1. ***Course Title:***

MS Neurosurgery

1. ***Training Centers:***

Departments of Neurosurgery at Rawalpindi Medical University (RMU).

1. ***Duration of Course:*** The duration of MS Neurosurgery course shall be five (5) years. First year in Part I and next four years in Part II with structured training in a recognized department under the guidance of an approved supervisor.
2. ***Course structure:*** The course is structured in 02 parts.

* **Part 1**

|  |  |  |
| --- | --- | --- |
| **S. No** | **Discipline** | **Duration** |
|  | General Surgery | 10months |
|  | Trauma and Orthopedics | 02 months **(Mandatory)** |

**Note:** Workshops must be attended during the first year of programme

**At the end of 02 years, the candidate will take up Intermediate Examination.**

* **Part 2**

It comprises of 2nd, 3rd, 4th and 5th year of the program. There are 02 components of the training: -

**1.Training in Neurosurgery.**

The candidate shall undergo training to achieve educational objectives of M.S Neurosurgery (knowledge and skills) along with rotations in the relevant fields. The training shall be competency based. There shall be generic and specialty specific competencies and shall be assessed by continuous Internal Assessment.

**Candidate will attend 02 mandatory rotations as listed below**

|  |  |  |
| --- | --- | --- |
| **S. No** | **Discipline** | **Duration** |
| **1.** | Neurology | 01 month |
| **2.** | Neuro-radiology | 1. Month |

**2. Synopsis, Research and Thesis writing.**

By the end of 3rdyear candidate should have selected, submitted and got his synopsis approved from RMU. Research Component and thesis writing shall be completed in 4thyear. Candidates will spend total time ranging from 06 months to 01 year for research during the training.

***ADMISSION CRITERIA***

Applications for admission to MS Training Programs will be invited through advertisement in print and electronic media mentioning closing date of applications and date of Entry Examination.

**Eligibility:** The applicant on the last date of submission of applications for admission must possess the:

1. Basic Medical Qualification of MBBS or equivalent medical qualification recognized by Pakistan Medical Commission.
2. Certificate of one year's House Job experience in institutions recognized by Pakistan Medical Commission Is essential at the time of interview. The applicant is required to submit Hope Certificate from the concerned Medical Superintendent that the House Job shall be completed before the Interview.
3. Valid certificate of permanent or provisional registration with Pakistan Medical Commission.

***REGISTRATION AND ENROLLMENT***

* As per policy of Pakistan Medical commission the number of PG Trainees/ Students per supervisor shall be maximum O5 per annum for all PG programmes including minor programmes (if any).
* Beds to trainee ratio at the approved teaching site shall be at least 5 beds per trainee.
* The University will approve supervisors for MS courses.
* Candidates selected for the courses: After their enrollment at the relevant institutions shall be registered with RMU as per prescribed Registration Regulations.

***AIMS AND OBJECTIVES OF THE COURSE***

***AIM***

The aim of five years MS program in Neurosurgery is to train residents to acquire the competency of a specialist in the field of Neurosurgery so that they can become good teachers, researchers and clinicians in their specialty after completion of their training.

***GENERAL OBJECTIVES***

1. To provide a broad experience in Neurosurgery, including its interrelationship with other disciplines.
2. To enhance neurosurgical knowledge, surgical and clinical skills, and competence in bedside diagnostic and therapeutic procedures.
3. To achieve the professional requirements to prepare for Higher Physician Training in one or more specialty in Neurosurgery.
4. To cultivate the correct professional attitude and enhance communication skill towards patients, their families and other healthcare professionals.
5. To enhance sensitivity and responsiveness to community needs and the economics of health care delivery.
6. To enhance critical thinking, self-learning, and interest in research and development of patient service.
7. To cultivate the practice of evidence-based medicine and critical appraisal surgical skills.
8. To inculcate a commitment to continuous neurosurgical education and professional development.
9. To provide a broad training and in-depth experience at a level for trainees to acquire competence and professionalism of a specialist in Neurosurgery especially in the diagnosis, investigation and treatment of neurosurgical problems towards the delivery of holistic patient care.
10. To acquire competence in managing acute neurosurgical emergencies and identifying neurosurgical problems in patients referred by primary care and other doctors, and in selecting patients for timely referral to appropriate tertiary care or the expertise of another specialty.
11. To develop competence in the inpatient and outpatient management of neurosurgical problems and in selecting patients for referral to tertiary care facilities and treatment modalities requiring high technology and/or the expertise of another specialty.
12. To manage patients in general neurosurgical units in regional/District hospitals; to be a leader in the health care delivery team and to work closely with networking units which provide convalescence, rehabilitation and long term care.
13. To encourage the development of skills in communication and collaboration with the community towards health care delivery.
14. To foster the development of skills in the critical appraisal of new methods of investigation and/or treatment.
15. To reinforce self-learning and commitment to continued updating in all aspects of Neurosurgery.
16. To encourage contributions aiming at advancement of knowledge and innovation in neurosurgery through basic and/or clinical research and teaching of junior trainees and other health related professionals.
17. To acquire professional competence in training future trainees in Neurosurgery at Rawalpindi Medical University.

***SPECIFIC OBJECTIVES***

**Neurosurgical Knowledge**

1. The development of a basic understanding of core Neurosurgery concepts.
2. Etiology, clinical manifestation, disease course and prognosis, investigation and management of common neurosurgical diseases.
3. Scientific basis and recent advances in pathophysiology, diagnosis and management of neurosurgical diseases.
4. Spectrum of surgical and clinical manifestations and interaction of multiple neurosurgical diseases in the same patient.
5. Psychological and social aspects of neurosurgical illnesses.
6. Effective use and interpretation of investigation and special diagnostic procedures.
7. Critical analysis of the efficacy, cost-effectiveness and cost-utility of treatment modalities.
8. Patient safety and risk management
9. Neurosurgical audit and quality assurance
10. Ethical principles and medico legal issues related to neurosurgical illnesses.
11. Updated knowledge on evidenced-based medicine and its implications for diagnosis and treatment of neurosurgical patients.
12. Familiarity with different care approaches and types of health care facilities towards the patients care with neurosurgical illnesses, including convalescence, rehabilitation, palliation, long term care, and medical ethics.
13. Knowledge on patient safety and clinical risk management.
14. Awareness and concern for the cost-effectiveness and risk-benefits of various advanced treatment modalities.
15. Familiarity with the concepts of administration and management and overall forward planning for a general neurosurgical unit.

**SKILLS**

1. Ability to take a detailed history, gathers relevant data from patients, and assimilates the information to develop diagnostic and management plan.
2. Students are expected to effectively record an initial history and physical examination and follow-up notes as well as deliver comprehensive oral presentations to their team members based on these written documents.
3. Competence in eliciting abnormal physical signs and interpreting their significance.
4. Ability to relate clinical abnormalities with pathophysiologic states and diagnosis of diseases.
5. Ability to select appropriate investigation and diagnostic procedures for confirmation of diagnosis and patient management.
6. Residents should be able to interpret basic as well as advanced laboratory data as related to the disorder/disease.
7. Basic understanding of routine laboratory and ancillary tests including complete blood count, chemistry panels, EEG, chest x-rays, CT brain, and body fluid cell counts. In addition, students will properly understand the necessity of incorporating sensitivity, specificity, pre-test probability and Bayes laws/theorem in the ordering of individual tests in the context of evaluating patients’ signs and symptoms.
8. The formulation of a differential diagnosis with up-to—date scientific evidence and clinical judgment using history and physical examination data and the development of a prioritized problem list to select tests and make effective therapeutic decisions.
9. Assessing the risks, benefits, and costs of varying, effective treatment options; involving the patient in decision making via open discussion; selecting drugs from within classes; and the design of basic treatment programs and using critical pathways when appropriate.
10. Residents must be able to perform competently all neurosurgical procedures essential for the practice of Neurosurgery. This includes technical proficiency in taking informed consent, performing by using appropriate indications, contraindications, interpretations of findings and evaluating the results and handing the complications of the related procedures mentioned in the syllabus.
11. Residents should be instructed in additional surgical skills that will be determined by the training environment, residents practice expectations, the availability of skilled teaching faculty, and privilege delineation.
12. Skills in performing important bedside diagnostic and therapeutic procedures and understanding of their indications. Trainees should acquire competence through supervised performance of the required number of each of the following procedures during the 4-year training period and should record them in the Trainee’s Log Book.

At least 10 times during the three-year training period:

* + Cardiopulmonary resuscitation
  + Central venous cannulation
  + Lumbar Puncture
  + Epidural Steroid injection
  + Sacroiliac Block
  + Endotracheal intubation
  + Emergency External ventricular drain Placement
  + Arterial Blood gases sampling
  + Percutaneous Tracheostomy

1. Ability to present clinical problems and literature review in grand rounds and seminars.
2. Good communication skills and interpersonal relationship with patients, families, medical colleagues, nursing and allied health professionals.
3. Ability to mobilize appropriate resources for management of patients at different stages of neurosurgical illnesses, including critical care, consultation of neurosurgical specialties and other disciplines, ambulatory and rehabilitative services, and community resources.
4. Competence in the diagnosis and management of emergency neurosurgical problems, in particular head injury including EDH, SDH, SAH and various fractures of the skull and spine.
5. Competence in the diagnosis and management of acute and chronic neurosurgical problems as secondary care in a regional/district hospital.
6. Diagnostic skills to effectively manage complex cases with unusual presentations.
7. Ability to implement strategies for preventive care and early detection of diseases in collaboration with primary and community care doctors.
8. Ability to understand neurosurgical statistics and critically appraise published work and clinical research on disease presentations and treatment outcomes. Experience in basic and/or clinical research within the training programme should lead to publications and/or presentation in seminars or conferences.
9. Practice evidence—based learning with reference to research and scientific knowledge pertaining to their discipline through comprehensive training in Research Methodology
10. Ability to recognize and appreciate the importance of cost-effectiveness of treatment modalities.
11. The identification of key information resources and the utilization of the medical literature to expand one’s knowledge base and to search for answer to neurosurgical problems. They will keep abreast of the current literature and be able to integrate it to clinical practice.

**Attitudes**

* 1. The well-being and restoration of health of patients must be of paramount consideration.
  2. Empathy and good rapport with patient and relatives are essential attributes.
  3. An aspiration to be the team-leader in total patient care involving nursing and allied medical professionals should be developed.
  4. The cost-effectiveness of various investigations and treatments in patient care should be recognized.
  5. The privacy and confidentiality of patients and the sanctity of life must be respected.
  6. The development of a functional understanding of informed consent, advanced directives, and the surgeon-patient relationship.
  7. Ability to appreciate the importance of the effect of disease on the psychological and socio-economic aspects of individual patients and to understand patients’ psycho-social needs and rights, as well as the medical ethics involved in patient management.
  8. Willingness to keep up with advances in Neurosurgery and other Specialties.
  9. Willingness to refer patients to the appropriate specialty in a timely manner.
  10. Aspiration to be the team leader in total patient care involving nursing and allied medical professionals.
  11. The promotion of health via adult immunizations, periodic health screening, and risk factor assessment and modification.
  12. Recognition that teaching and research are important activities for the advancement of the profession.

***OTHER REQUIRED CORE COMPETENCIES:***

**PATIENT CARE**

* + Residents are expected to provide patient care that is compassionate, appropriate and effective for the promotion of health, prevention of illness, treatment of disease and at the end of life.
  + Gather accurate, essential information from all sources, including medical articles, physical examinations,

Medical records and diagnostic/therapeutic procedures.

* + Make informed recommendations about preventive, diagnostic and therapeutic options and interventions based on clinical judgment, scientific evidence, and patient preference.
  + Develop, negotiate and implement effective patient management plans and integration of patient care.
  + Perform competently the diagnostic and therapeutic procedures considered essential to the practice of Neurosurgery.

**INTERPERSONAL AND COMMUNICATION SKILLS**

* + Residents are expected to demonstrate interpersonal and communication skills that enable them to establish and maintain professional relationships with patients, families, and other members of health care teams.
  + Provide effective and professional consultation to other physicians and health care professionals and sustain

therapeutic and ethically sound professional relationships with patients, their families, and colleagues.

* + Use effective listening, nonverbal, questioning, and narrative skills to communicate with patients and families.
  + Interact with consultants in a respectful, appropriate manner.
  + Maintain comprehensive, timely, and legible medical records.

**PROFESSIONALISM**

* + Residents are expected to demonstrate behaviors that reflect a commitment to continuous professional developmental, ethical practice, an understanding and sensitivity to diversity and a responsible attitude toward their patients*,* their profession, and society.
  + Demonstrate respect, compassion, integrity, and altruism in relationships with patients, families, and colleagues.
  + Demonstrate sensitivity and responsiveness to the gender, age, culture, religion, sexual preference,

socioeconomic status, beliefs, behavior and disabilities of patients and professional colleagues.

* + Adhere to principles of confidentiality, scientific/academic integrity, and informed consent.
  + Recognize and identify deficiencies in peer performance.
  + Understand and demonstrate the skill and art of end of life care.

**PRACTICE-BASED LEARNING AND IMPROVEMENT**

* + Residents are expected to be able to use scientific evidence and methods to investigate, evaluate, and improve

patient care practices.

* + Identify areas for improvement and implement strategies to enhance knowledge, skills, attitudes and processes of care.
  + Analyze and evaluate practice experiences and implement strategies to continually improve the quality of patient practice.
  + Develop and maintain a willingness to learn from errors and use errors to improve the system or processes of care.
  + Use information of technology or other available methodologies to access and manage information, support patient care decisions and enhance both patient and physician education.

**SYSTEM-BASED PRACTICE**

* + Residents are expected to demonstrate both an understanding of the contexts and systems in which health care

is provided, and the ability to apply this knowledge to improve and optimize health care.

* + Understands accesses and utilizes the resources, providers and systems necessary to provide optimal care.
  + Understand the limitations and opportunities inherent in various practice types and delivery systems, and

develop strategies to optimize care for the individual patient.

* + Apply evidence-based, cost-conscious strategies to prevention, diagnosis, and disease management.
  + Collaborate with other members of the health care team to assist patients in dealing effectively with complex systems and to improve systematic processes of care.

# **SECTION- II SYLLABUS OUTLINES**

***BASIC SCIENCES:***

Student is expected to acquire comprehensive knowledge of Anatomy, Physiology, Pathology and Pharmacology relevant to surgical practice appropriate for Neurosurgery

1. **Anatomy**

* Detailed Anatomy of the organ systems of body, their blood supply, nerve supply, lymphatic drainage and important gross relations to other organs as appropriate for neurosurgical procedures
* Developmental Anatomy and associated common congenital abnormalities
* Features of Surface, Imaging and Applied Anatomy within skull, brain, spinal cord, peripheral nervous system and head and neck
* Relate knowledge to assessment of clinical situation or progress of disease condition

**Embryogenesis of the brain and spinal cord**

* Embryogenesis of supporting structures - skull and vertebral column
* Common anatomical variations and developmental abnormalities
* Embryogenesis of the skeleton and muscle development

**Structure, blood supply, innervation, surface and three-dimensional relationships of the:**

* Scalp
* Skull
* Meninges
* Orbit
* Cranial fossae
* Cranial foramina
* Cranial nerves
* Vertebral column
* Spinal cord: ascending and descending tracts
* Spinal nerve roots
* Cauda equina

**Cortical Topography:**

* Projection and association tracts
* Organization of the basal ganglia
* Structure, organization and connections of the cerebellum, pons and brainstem
* Cranial nerves and their relationships
* Visual and auditory pathways
* Ventricular system and choroid plexus
* Subarachnoid space and cisterns
* Circle of Willis and principle regional and segmental blood supply
* Venous drainage and dural sinuses

**Structure, innervation and Distribution of autonomic and peripheral nervous system:**

* Sympathetic and parasympathetic pathways
* Visceral and pelvic innervation: control of sphincter function
* Brachial plexus
* Lumbosacral plexus
* Course, distribution and innervation of the major peripheral nerves

**Applied Anatomy**

* Stereotaxis
* Embryology and mal-development
* Differences between foetal, infant, child and adult brain
* Development of facial and cranial skeleton
* Branchial arches and the vascular system
* Development of the ventricular system
* Development of the cerebral hemispheres
* Development of brain stem and cranial nerves
* The notochord
* The sub-ependymal plate (sub-ventricular zone)
* Development of the pituitary gland
* The external granular layer of the cerebellum
* Spinal cord development
* Applied embryology of the CNS and its coverings

**Physiology**

Functional Neurophysiology: Cellular organization, structure function correlations and physiological alterations in the central and peripheral nervous systems of body

**Functional Neurophysiology:**

* Structure and function of neurons and glial cells
* Synaptic function, action potentials and axonal conduction
* Higher cerebral functions
* Sleep and coma
* Memory and disorders of the limbic system
* Control of motor function: ascending and descending pathways, basal ganglia and cerebellar function
* The special senses
* Hypothalamic-pituitary function
* Cerebral blood flow and metabolism
* Cerebral auto-regulation and vasospasm
* Blood brain barrier and cerebral edema
* Intracranial pressure dynamics
* Cerebral ischemia and neuroprotection
* CSF hydrodynamics - production and absorption

**Autonomic Nervous System:**

* Differing effects of sympathetic and parasympathetic innervation
* Effects on differing physiological processes

**Clinical Neurophysiology:**

* Principles of electroencephalography
* Principles of somatosensory, motor and brainstem evoked potential monitoring
* Peripheral neuropathies and entrapment neuropathies including:
* Structure and function of peripheral nerves
* Use of nerve conduction studies
* Disorders of the neuromuscular junction including:
* Structure and function of smooth and striated muscle
* Use of electro-myographic studies

**Clinical Skills**

* Interpretation of the results of EEG, EMG and NC studies
* Membrane biochemistry and signal transduction
* Enzymes and biologic catalysis
* Tissue metabolism
* Carbohydrate metabolism
* Lipid metabolism
* Nitrogen metabolism

**Neurochemistry (Including Neuro-endocrinology)**

* Fundamentals of Chemistry
* Introduction to acid-base chemistry and equilibrium
* Fundamentals of Neurochemistry
* CNS metabolism
* Principle of neuronal communication
* Mechanism controlling transmitter release
* Transduction mechanisms in the post-synaptic cells
* Characteristics of synaptic potential
* Process of synaptic summation (spatial and temporal)
* Neurotransmitters & Synaptic Transmission
* Neurotransmitters and receptors
* Important neurotransmitters and chemical messengers

**Chemical Classification**

* Nitric Oxide
* Eicosanoids
* Acetylcholine
* Amino acid transmitters
* Serotonin
* Catecholamines
* Peptides

**Pharmacology**

* The Evolution of Neurosurgical Drugs
* British Pharmacopia
* Introduction to Pharmacology
* Receptors
* Mechanisms of Drug Action
* Pharmacokinetics
* Pharmacokinetic Process
* Absorption
* Distribution
* Metabolism
* Desired Plasma Concentration
* Volume of Distribution
* Elimination
* Elimination rate constant and half life
* Creatinine Clearance
* Drug Effect
* Beneficial Responses
* Harmful Responses
* Allergic Responses
* Drug Dependence, Addiction, Abuse and Tolerance
* Drug Interactions
* Dialysis
* Drug use in pregnancy and in children

**Pathology**

Pathological alterations at cellular and structural level in infection, inflammation, ischemia, neoplasia and trauma affecting the nervous system.

* Cell Injury and adaptation
* Reversible and Irreversible Injury
* Fatty change, Pathologic calcification
* Necrosis and Gangrene
* Cellular adaptation
* Atrophy, Hypertrophy,
* Hyperplasia, Metaplasia, Aplasia

**Inflammation**

* Acute inflammation
* Cellular components and chemical mediators of acute inflammation
* Exudates and transudate
* Sequelae of acute inflammation
* Chronic inflammation
* Etiological factors and pathogenesis
* Distinction between acute and chronic (duration) inflammation
* Histologic hallmarks
* Types and causes of chronic inflammation, non-granulomatous & granulomatous,

**Haemodynamic disorders**

* Etiology, pathogenesis, classification and morphological and clinical manifestations of Edema,

Haemorrhage, Thrombosis, Embolism, Infarction & Hyperaemia

* Shock; classification etiology, and pathogenesis, manifestations.
* Compensatory mechanisms involved in shock
* Pathogenesis and possible consequences of thrombosis
* Difference between arterial and venous emboli

**Neoplasia**

* Dysplasia and Neoplasia
* Benign and malignant neoplasms
* Etiological factors for neoplasia
* Different modes of metastasis
* Tumor staging system and tumor grade

**Immunity and Hypersensitivity**

* Immunity
* Immune response
* Diagnostic procedures in a clinical Immunology laboratory
* Protective immunity to microbial diseases
* Tumour immunology
* Immunological tolerance, autoimmunity and autoimmune diseases.
* Transplantation immunology
* Hypersensitivity
* Immunodeficiency disorders
* Immunoprophylaxis& Immunotherapy

**Related Microbiology**

* Role of microbes in various central and peripheral nervous system diseases
* Infection source
* Nosocomial infections
* Bacterial growth and death
* Pathogenic bacteria
* Vegetative organisms
* Spores
* Important viruses
* Important parasites
* Surgically important microorganisms
* Sources of infection
* Asepsis and antisepsis
* Sterilization and disinfection
* Infection prevention
* Immunization
* Personnel protection from communicable diseases
* Use of investigation and procedures in laboratory

**Special Pathology**

* Cerebral hypoxia and ischemia
* Cytopathology of neurons and glial in response to ischemia, hypoxia and trauma
* Diffuse axonal injury
* Congenital malformations of the nervous system
* Cerebral and spinal vascular disorders and lesions of extracranial vessels
* Brain and spinal cord trauma
* Acute and chronic inflammatory processes in the CNS
* Meningitis, encephalitis, brain abscess and other disorders of bacterial, viral, fungal or parasitic
* origin
* Principles and practice of antibiotic therapy
* Slow viruses and the brain
* Bacterial, fungal and parasitic meningitis, encephalitis and abscess formation
* Viral encephalitis
* Slow viruses, CJD and vCJD
* HIV associated infections, tumours and leucoencehalopathies
* The dementias
* Causes of epilepsy
* Demyelinating diseases
* Diseases of the scalp, skull and meninges
* Diseases and degenerative disorders of the spine
* Inborn errors of metabolism
* Diseases of muscle
* Brain shifts, herniation and raised intracranial pressure
* Classification, epidemiology and pathology of CNS tumours
* Techniques of biopsy and tissue preparation, staining and immunohistochemical
* Orbital tumours
* Tumour biology, cell kinetics, tumour markers, immunocytochemistry

***Fundamental Principles of Surgery (*FIRST YEAR MS Neurosurgery)**

* History of surgery
* Preparing a patient for surgery
* Principles of operative surgery: asepsis, sterilization and antiseptics
* Surgical infections and antibiotics
* Basic principles of anaesthesia and pain management
* Acute life support and critical care:
* Pathophysiology and management of shock
* Fluids and electrolyte balance/ acid base metabolism
* Haemostasis, blood transfusion
* Trauma: assessment of poly-trauma, triage, basic and advanced trauma
* Accident and emergency surgery
* Wound healing and wound management
* Nutrition and metabolism
* Principles of burn management
* Principles of surgical oncology
* Principles of laparoscopy and endoscopy
* Organ transplantation
* Informed consent and medicolegal issues
* Molecular biology and genetics
* Operative procedures for common surgical manifestations e.g cysts, sinuses, fistula, abscess,
* nodules, basic plastic and reconstructive surgery
* Principles of basic diagnostic and interventional radiography
* Principles and interpretation of conventional and advanced radiographic procedures

**Common Surgical Skills**

**Incision of skin and subcutaneous tissue**:

* Langer’s lines
* Healing mechanism
* Choice of instrument
* Safe practice
* Ability to use scalpel, diathermy and scissors

**Closure of skin and subcutaneous tissue:**

* Options for closure
* Suture and needle choice
* Safe practice
* Accurate and tension free apposition of wound edges

**Knot tying:**

* Choice of material
* Single handed
* Double handed
* Superficial
* Deep

**Tissue retraction:**

* Choice of instruments
* Placement of wound retractors
* Tissue forceps

**Use of drains:**

* Indications
* Types
* Insertion
* Fixation
* Management/removal

**Haemostasis:**

* Control of bleeding vessel (superficial)
* Diathermy
* Suture ligation
* Tie ligation
* Clip application
* Plan investigations
* Clinical decision making
* Case work up and evaluation; risk management

**Pre-operative assessment and management:**

* Cardiorespiratory physiology
* Diabetes mellitus
* Renal failure
* Pathophysiology of blood loss
* Pathophysiology of sepsis
* Risk factors for surgery
* Principles of day surgery
* Management of comorbidity

**Intraoperative care:**

* Safety in theatre
* Sharps safety
* Diathermy, laser use
* Infection risks
* Radiation use and risks
* Tourniquets
* Principles of local, regional and general anaesthesia

**Post-operative care:**

* Monitoring of postoperative patient
* Postoperative analgesia
* Fluid and electrolyte management
* Detection of impending organ failure
* Initial management of organ failure
* Complications specific to particular operation
* Critical care

**Blood products:**

* Components of blood
* Alternatives to use of blood products
* Management of the complications of blood product transfusion including children

**Antibiotics:**

* Common pathogens in surgical patients
* Antibiotic sensitivities
* Antibiotic side-effects
* Principles of prophylaxis and treatment

**Safely assess the multiply injured patient:**

* History and examination
* Investigation
* Resuscitation and early management
* Referral to appropriate surgical subspecialties

**Technical Skills**

* Central venous line insertion
* Chest drain insertion
* Bleeding diathesis & corrective measures, e.g. warming, packing
* Clotting mechanism; Effect of surgery and trauma on coagulation
* Anticoagulation, heparin and warfarin
* Awareness of symptoms and signs associated with pulmonary embolism and DVT
* Role of duplex scanning, venography and d-dimer measurement

**Diagnosis and Management of Common Surgical Conditions:**

* Patient with abdominal pain
* Burn and degloving injuries
* Peripheral vascular disease
* ATLS , shock and torso trauma
* Hernia
* Hydrocoele
* Constipation
* Head / neck swellings
* Abscess
* In growing toenail
* Head and neck swellings

**Elective Procedures in 1st year of training:**

* Inguinal hernia (not neo-natal)
* Circumcision
* Lymph node biopsy
* Insertion of CV lines
* Management of in growing toenails
* Excision of skin lesions

**Emergency Procedures**

* Appendicectomy
* Incision and drainage of abscess
* Insertion of pleural drain
* Insertion of suprapubic catheter
* Opening and closing of laparotomy

**Mandatory Rotation Orthopaedics**

* General principles of orthopaedics trauma
* Ordering and interpretation of investigations
* Basics of stabilization techniques of fractures
* Knowledge and skill to anticipate and manage concomitant vascular injury
* Principles of amputation

***Common Neurosurgical Disorders & management (Clinical Component)* *SECOND YEAR ONWARDS***

**Congenital and Paediatric Neurosurgery**

Neurological evaluation of the neonate and infant

Developmental malformations of the CNS and its coverings

**Spinal Dysraphism:**

* Spina bifida and its variants; aetiology
* Spinal cord tethering syndromes
* Management of congenital and acquired spinal deformity e.g. syndromic spinal deformity and post-operative spinal deformity
* Encephalocoele

**Craniosynostosis**;

* Types , associated syndromes
* Principles of craniofacial reconstruction

**Intracranial and spinal tumours in children**

* Intracranial and spinal tumor in children
* Stereotactic and image guided biopsy of paediatrictumours
* Endoscopic biopsy of third ventricular tumours
* Resection of supratentorial and infratentorial intrinsic tumours
* Approaches to suprasellar, third ventricular and pineal tumours
* Management of spinal cord tumours

**Craniovertebral Anomalies:**

* chiari malformatiom and variants , Dandy walker malformation and variants
* Syringomyelia ; causes &management
* Foramen magnum decompression, syringostomy, syringe-pleural/syringe-subarachnoid shunting, de-tethering and duraplasty

**Vascular lesions**

* subarachnoid haemorrhage, haemorrhagic stroke and ischaemia stroke ,intracranial aneurysms, arteriovenous malformations and fistulae, cavernomas, arterial dissection, moya-moya disease and venous sinus thrombosis
* Surgical and endovascular strategies for the management of acute intracranial vascular disorders in children
* Ethical considerations

**Paediatric Hydrocephalus:**

* Differential diagnosis of shunt malfunction
* Interpretation of CT scans in shunted children
* Taping and draining from an Ommaya reservoir& shunt
* CSF physiology
* Pathophysiology, investigation and classification of hydrocephalus and its complications
* Benign intracranial hypertension
* Neurosurgical and surgical methods of treatment of hydrocephalus and long term complications
* The assessment and operative and conservative management of patients with communicating and non-communicating hydrocephalus with or without impaired consciousness.
* The assessment of patient with hydrocephalus; emergency external ventricular drainage in patients with acute hydrocephalus & management of other complications
* The insertion and revision of ventriculo-peritoneal, ventriculo-atrial and lumbo-peritoneal shunts;
* endoscopic third ventriculostomy
* Image-guided placement of ventricular catheters

**Neurovascular Surgery**:

Pathophysiology, etiology and management of various neurovascular disorder

1. **Subarachnoid Hemorrhage and Intracranial Aneurysms:**

* Principles of resuscitation and timing of interventions.
* Indications for CT scanning, diagnostic lumbar puncture, CT angiography and digital subtraction
* angiography.
* Principles of management of post-haemorrhagic hydrocephalus
* Interpretation of CT scans including assessment of intracranial blood load, hematomas and
* hydrocephalus
* Basic interpretation of cerebral angiography
* Diagnostic & therapeutic lumbar puncture
* To undertake an atraumatic lumbar puncture
* Interpretation of basic microscopy and biochemistry
* Principles of spectrophotometry
* Management of delayed secondary ischemia
* Principles governing the augmentation of cerebral blood flow
* Assessment of a deteriorating patient
* Recognition and management of secondary insults
* Management of hypervolaemic hypertension
* Insertion of central venous catheter
* Insertion of lumbar drain
* Insertion of external ventricular drain
* Indications for external ventricular drainage and lumbar subarachnoid drainage
* Surgical and endovascular strategies for the management of ruptured and un-ruptured intracranial aneurysms
* Principles of microvascular reconstruction and bypass for complex aneurysms

1. **Intracranial Arterio-venous Malformations:**

* Types, etiology of Arterio-venous malformation
* Clinical Presentations of Arterio-venous malformation
* Surgical, endovascular and radiosurgical strategies for the management of Arteriovenous malformations

1. **Cerebrovascular occlusive disorders**

* Etiology, location of occulusive disorders
* Clinical presentation
* General management
* Surgical management and criteria for surgical management
* Extracranial carotid/vertebral disease; carotid endarterectomy; brain revascularisation

1. **Intracerebral Hematomas**

* Etiologies, epidemiology and Pathophysiology
* Interpretation of investigations
* Initial management
* Surgical techniques and outcomes

1. **Other Vascular Disorders:**

* Etiology and clinical Presentation of miscellaneous neuro-vascular disorders
* Surgical and endovascular treatment of dural arteriovenous fistulae and cavernomas
* Image-guided resection of cavernomas

**Head trauma**

* Mechanisms and patterns of traumatic brain and associated spinal cord damage
* Pathophysiology of CNS trauma
* Cerebral perfusion and oxygenation
* Raised intracranial pressure and management
* Impaired intracranial compliance
* Intracranial herniation
* Epidemiology and prevention of head injury
* Transport, retrieval and pre-hospital care
* Initial resuscitation and triage
* Clinical Assessment
* Natural history of recovery from head injury including neurological, cognitive and behavioural disability and post- traumatic epilepsy
* Management including operation for 'surgical' complications (eg. acute and chronic haematoma, open injury, CSF fistula, traumatic vascular injuries, spinal instability, late hydrocephalus).
* 'Neurosurgical' management of persisting unconsciousness
* Assessment of outcome, factors affecting prognosis and late sequelae
* Perioperative and neuro-intensive care
* Respiratory functions and ventilation
* Management of disorders of fluid balance; nutrition and feeding
* Blood coagulation and transfusion
* Fever in neurosurgical patients
* Confusion, restlessness and agitation in neurosurgery
* Informed consent and medicolegal aspects
* seizures and focal neurological deficit : recognition and management
* Principles, diagnosis and confirmation of brain death
* Principles of ICP monitoring of head injury patients
* Role of neurological rehabilitation
* Clinical assessment of polytrauma.
* Neurological assessment and management of the head-injured patient including: Assessment and categorization of impaired consciousness
* Interpretation of CT scans and plain radiology
* Standard frontal burr hole and/or twist drill craniostomy
* Burr hole evacuation of chronic subdural haematoma
* Neurological assessment of patients with a CSDH
* Craniotomy for supratentorial traumatic haematoma, in particular: Planning of craniotomies for evacuation of haematomas
* Handling the "tight" brain and decompressive craniectomy.
* Achieving haemostasis in the coagulopathic patient
* Achieving haemostasis from the skull base and venous sinuses
* Elevation of compound depressed skull fracture and fronto-orbital disruption with dural repair
* Delayed cranioplasty of skull vault and growing skull fractures
* Indications for primary and secondary closure of wounds
* Wound exploration under local and general anaesthesia
* Wound debridement
* Arrest of scalp haemorrhage
* Layered closure of the scalp without tension and suturing techniques.
* Management of postoperative CSF fistulae
* Indications for endoscopic repair of basal CSF fistula
* Techniques for open repair and skull-base reconstruction

**SPINE TRAUMA**

* Immobilization of spine and stabilization
* Spine boards and collars application
* Clinical assessment of spine injuries
* Assessment and management of penetrating injuries.
* Radiological investigation and interpretation
* Application of halo traction
* Pathophysiology, Assessment and management of spinal shock and cord injuries.
* Neurogenic bladder and DVT and pulmonary embolism
* Reduction and internal stabilization of atlanoaxial , subaxial and thoracolumbar fractures.

**Infections**

* The pathophysiology of intracranial and spinal sepsis
* Infective complications of neurosurgical procedures – treatment and prophylaxis
* Intracranial and spinal abscess/ empyema-clinical features, investigation and management
* The aetiology and pathophysiology of spinal sepsis
* Indications for drainage of spinal epidural abscess by laminectomy and multiple laminotomies
* Bacterial, viral, fungal and parasitic infections of the CNS and spine
* Opportunistic infections, HIV and AIDS
* The aetiology and pathophysiology of vertebral osteomyelitis and discitis, including pyogenic, tuberculous and atypical infections
* Indications for percutaneous and open biopsy
* Principles of anti-microbial chemotherapy
* Indications for operative intervention
* Principles of peri-operative care
* Surgical complications and their management

**NEURO-ONCOLOGY**

* Presenting features and investigations of tumours involving the central nervous and peripheral nervous system
* Classification, natural history and pathology of benign and malignant intracranial neoplasia
* Pathophysiology and management of raised intracranial pressure associated with space occupying tumours
* Diagnostic imaging of intracranial tumours including the interpretation of CT and MRI scans and the role of MRS
* Principles of clinical trials and their application to neuro-oncology
* Management(Preop , intra op and post op)
* Principles and techniques of tumour biopsy, stereotactic , endoscopic and robotic surgeries
* Principles of fractionated radiotherapy, stereotactic radiotherapy and radiosurgery and adjuvant chemotherapy.
* Patient positioning , incision marking and craniotomy .
* Intra-op management of ICP.
* Appropriate exposure of the tumour, using operating microscope as
* necessary
* Safe use of fixed retractors
* Precise use of suction, electro-coagulation and ultrasonic aspiration
* Intracranial haemostasis
* Advanced surgical techniques including awake craniotomy; stereotactic craniotomy, intra-operative neurophysiological monitoring
* Advanced image guidance with integration of functional data; Intraoperative imaging techniques
* Use of intraoperative chemotherapy wafer
* Detection and management of post-operative complications e.g. cerebral swelling, intracranial haematomas and intracranial sepsis; the management of post-operative seizures

**Skull-Base and Craniofacial Surgical Access:**

* Surgical anatomy of skull base
* Endoscopic and transcranial approaches to skull base.
* Anticipation and management of per op and post op complications.

**SPINE TUMORS**

* Etiologies , pathophysiology ,epidemiology and types of spinal cord tumors.
* Clinical assessment and radiological investigations and interpretation of spinal tumors .
* General and basic surgical management of patients with spinal cord tumors.
* Surgical management : biopsy ,excision and fixation for stabilization of spine. (use of magnification )
* Anticipation and management of post op complications.

**Spinal disorders**

* Etiology , epidemiology and pathophysiology and investigations of spinal diseases and differential diagnosis
* Conservative management and Biomechanics of the spine and principles of spinal stabilization/fusion & approaches for different spinal diseases.
* Management of spasticity (surgical , intrathecal drug delivery system)and role of physiotherapy.
* Scoliosis and spondylolisthesis and management.
* Inflammatory spinal diseases : diagnosis and management.

**Pain**

* Pathophysiology of pain; differential diagnosis
* General and psychological factors in pain management
* Analgesics and pain relief
* Craniofacial pain syndromes
* Nerve blocks, electrical stimulation , intrathecal drug administration and RF lesions for pain relief; implants; cordotomy and myelotomy
* DREZ lesions; Dorsal rhizotomy
* Role of Deep brain stimulation
* Microvascular decompression.

**Peripheral nerves**

* The diagnosis and treatment of common peripheral nerve problems including entrapment neuropathies, thoracic outlet and brachial plexus, causalgia and sympathetic dystrophy
* Theory and practice of nerve repair, decompression and cranial nerve reconstruction

**Functional and Stereotactic Neurosurgery**

* Principles and techniques of stereotactic and computer-assisted image-guided surgery
* Stereotactic radio-surgery
* Movement disorders and epilepsy :etiology , investigation and surgical treatment
* Classification, causes and presentations of dysphasia , dysarthria, speech dyspraxia and dyslexia
* Role of speech and language therapists in assessment and treatment
* Dysphagia: causes ,Investigation and management
* Aaetiology, differential diagnosis, investigation and initial management of patients presenting with
* sphincteric disorders
* Interpretation of urodynamic studies

**Neuro-ophthalmology / Neuro-otology**

* Visual acuity and visual fields; fundal *examination*
* Patterns of visual loss , diplopia and nystagmus in relation to cranial lesions.
* Significance of abnormalities of the pupils, fundi, external ocular movements and the visual fields
* Significance of abnormalities of hearing and of the vestibular system
* Common causes of conductive and sensorineural hearing loss
* Principles of audiological assessment

**Rehabilitation of the Neurosurgical Patient**

* Distinction between, and relevance of, concepts of limitation, disability and handicap
* Methods of assessment
* Patterns of natural history of recovery after Neurosurgical treatment, outcome and confounding factors
* Use of components of rehabilitation provided by specific neurosurgical and paraneurosurgical disciplines and interdisciplinary approaches, including community and family reintegration and medicolegal aspects

**Evidence based Neurosurgery; Audit and Trial design**

* To understand the provisional nature of knowledge
* To be able to identify failure of current treatments
* To cope with uncertainty and biological variability
* To be able to critically assess the neurosurgical literature
* Principles of audit and randomized control trials.
* Outcome assessment
* Clinical trials : designing and execution

***SPECIFIC LEARNING OUTCOMES :***

On completion of the training programme, Neurosurgery trainees including those pursuing an academic pathway will be expected to have demonstrated competence in all aspects of the published syllabus. The specific training component would be targeted for establishing clearly defined standards of knowledge and skills required to practice Neurosurgery at secondary and tertiary care level with proficiency in the Basic and applied clinical neurosciences, Basic neurosurgical care, Neurointensive care, Emergency (A&E) medicine and Complementary surgical disciplines.

**1. Neuroanatomy:**

* To have a working knowledge of the structure and development of the central and peripheral nervous system together with the related parts of the head and spine and associated structures of neurosurgical importance.

**2. Neurophysiology:**

* To be familiar with the normal and abnormal physiology and metabolism of the body and central nervous system.
* To be familiar with the basic principles and interpretation of EEG, EMG and other techniques of applied neurophysiology, particularly those used intra-operatively and in neuro-intensive care.

**3. Neuropathology and Neuro-pharmacology:**

* To be familiar with the pathological changes and cellular organization of the central and peripheral nervous system during disease process.
* To have a working knowledge of the gross and microscopic pathology of diseases affecting the nervous system.
* To recognize gross and microscopic preparations
* To be familiar with the various pathogenic organisms responsible for infections of the nervous system
* To be familiar with the basic principles of neuro-pharmacology and
* Neurochemistry with special reference to the actions, interactions and toxic effects of drugs currently used in neurosurgery.

**4. Neuroradiology:**

* To be able to recognize and comment on abnormalities present on plain X-Rays of the skull, spine and other regions of neurosurgical interest and to interpret special investigations such as myelograms, angiograms, CT and MRI scans
* To be familiar with the principles of radiobiology and radiotherapy
* To be familiar with the application of radionuclide studies to the diagnosis of neurological disorders.

**5. Neurosurgery Related Clinical Competence:**

* The ability to construct a differential diagnosis, interpret investigations and construct a management plan for common conditions in practice of neurosurgery in the following specialties

**a) Clinical Neurology**

* To be able to take a neurological history , perform reliable examination and arrive at pertinent diagnosis and management plan.
* To be conversant with all common neurosurgical disorders
* To be able to describe in detail and to discuss the choice of the appropriate conventional neurosurgical procedures available
* To be familiar with the principles of psychiatry, neuro-psychology, neuro-opthalmology, neuro-otology and neuro-anaesthesia

**b) Paediatric Neurosurgery**:

* The resident shall be proficient in the management of developmental disorders of the neuraxis including craniofacial anomalies and spinal dysraphism; all forms of hydrocephalus; intrinsic tumours of the brain and spine and a wide range of rarer pathologies

**c) Neuro-oncology:**

* Resident shall be able to examine , investigate and make differentials of neurological tumors and be able to make and execute plan of management.

1. **Functional Neurosurgery:**

* Residents are expected to diagnose different types of epilepsy , movement disorders and pain syndromes and formulate a specific management plan.

1. **Neurovascular Surgery:**

* Resident should be familiar and develop expertise in dealing with different neurovascular disorders and complications.

1. **Skull-base surgery:**

* Residents are expected to have working knowledge of skull base anatomy, pathologies, relevant complications and their line of management.
* Residents should develop basic skills of handling neuroendoscope.

1. **Spinal surgery:**

Spinal surgery is now the largest subspecialty in neurosurgery and accounts for more than 50% of the operative workload of some departments. the residents should be able to diagnose spinal disorders in outdoor and indoor and develop surgical skills to manage them.

1. **Traumatology:**

The resident must be able to provide a prompt neurosurgical intervention and neurointensive care and management in patients with head injury .

**6. Research Experience:**

All residents in the categorical program are required to complete an academic outcomes-based research project during their training. The research work shall be compiled in the form of a thesis which is to be submitted for evaluation by each resident before end of the training. The designated Faculty will organize and mentor the residents through the process, as well as journal clubs to teach critical appraisal of the literature.

# **SECTION III**

***Competency Levels:***

**Key to Competency levels in clinical skills:**

1. Observer Status
2. Assistant Status
3. Performed Under Supervision
4. Performed independently

A candidate is expected to attain the laid down level of competence for the following procedures by the end of each year as given below:

COMPETENCY LEVELS IN PATIENT MANAGEMENT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Year 2 | Year 3 | Year 4 | Year 5 |
| **Patient Management & Procedures** | | | | |
| Taking History | 3 | 4 | 4 | 4 |
| Physical Examination | 2 | 4 | 4 | 4 |
| Ordering investigation | 2 | 4 | 4 | 4 |
| Performing Myelography | 1 | 4 | 4 | 4 |
| Interpreting Result | 2 | 4 | 4 | 4 |
| Decision making | 2 | 3 | 3 | 4 |
| Bur Hole | 2 | 3 | 4 | 4 |
| Shunt | 2 | 2 | 4 | 4 |
| Ventricular Drain | 2 | 3 | 4 | 4 |
| Elevation of depressed fracture | 2 | 3 | 4 | 4 |
| Spinal decompression | 2 | 2 | 3 | 4 |
| Lumber disc Surgery | 2 | 2 | 3 | 4 |
| Tuberculous spine | 2 | 2 | 3 | 3 |
| Craniotomy for extradural/subdural | 1 | 2 | 3 | 4 |
| Cervical decompression | 1 | 2 | 2 | 3 |
| Spinal tumours | 1 | 2 | 2 | 3 |
| Gliomas | 1 | 2 | 2 | 3 |
| Brain abscess | 2 | 2 | 4 | 4 |
| Spinal fusion | 2 | 2 | 3 | 4 |
| Spinal Instrumentation | 2 | 2 | 3 | 4 |
| Trigeminal rhizotomies | 1 | 1 | 2 | 3 |
| Cervical disc prolapsed | 1 | 2 | 3 | 4 |
| Syringomylia | 1 | 2 | 2 | 3 |
| Meningiomas | 1 | 2 | 2 | 3 |
| Aneurysm Surgery | 1 | 2 | 2 | 3 |
| Cerebellopontine angle tumors | 1 | 2 | 2 | 3 |
| Brain stem tumors | 1 | 2 | 2 | 2 |
| Arteriovenous malformations | 1 | 2 | 2 | 3 |
| Orbital Tumours | 1 | 2 | 2 | 2 |
| Skull Base Tumours | 1 | 2 | 2 | 3 |
| Pituitary Tumours | 1 | 2 | 2 | 3 |
| Craniopharyngioma | 1 | 2 | 2 | 3 |
| Cranioplasty | 1 | 2 | 3 | 4 |

***Methods of Teaching & Learning during course conduction***

As a policy, active participation of students at all levels will be encouraged.

Following teaching modalities will be employed:

1. Problem Based learning

2. Seminar Presentation and Journal Club Presentations

3. Group Discussions

4. Grand Rounds

5. Clinico-pathological Conferences

6. SEQ as assignments on the content areas

7. Skill teaching in ICU, Operation theatres, emergency and ward settings

8. Self study, assignments and use of internet

9. Bedside teaching rounds in ward

10. OPD & Follow up clinics

11. Long and short case presentations

In addition to the conventional teaching methodologies interactive strategies like conferences will also be introduced to improve both communication and clinical skills in the upcoming consultants. Conferences must be conducted regularly as scheduled and attended by all available faculty and residents. Residents must actively request autopsies and participate in formal review of gross and microscopic pathological material from patients who have been under their care. It is essential that residents participate in planning and in conducting conferences.

**Clinical Case Conference**

Each resident will be responsible for at least one clinical case conference each month. The cases discussed may be those seen on either the consultation or clinic service or during rotations in specialty areas. The resident, with the advice of the Attending Surgeon on the Consultation Service, will prepare and present the case(s) and review the relevant literature.

**Monthly Student Meetings**

Each affiliated neurosurgical college approved to conduct training for MS Neurosurgery will provide a room for student meetings/discussions such as:

a. Journal Club Meeting

b. Core Curriculum Meetings

c. Skill Development

**a. Journal Club Meeting**

* A resident will be assigned to present, in depth, a research article or topic of his/her choice of actual or potential broad interest and/or application. Two hours per month should be allocated to discussion of any current articles or topics introduced by any participant. Faculty or outside researchers will be invited to present outlines or results of current research activities. The article should be critically evaluated and its applicable results should be highlighted, which can be incorporated in clinical practice. Record of all such articles should be maintained in the relevant department.

**b. Core Curriculum Meetings**

* All the core topics of Neurosurgery should be thoroughly discussed during these sessions. The duration of each session should be at least two hours once a month. It should be chaired by the chief resident . Each resident should be given an opportunity to brainstorm all topics included in the course and to generate new ideas regarding the improvement of the course structure

**c. Skill Development**

* Two hours twice a month should be assigned for learning and practicing clinical skills.
* List of skills to be learnt during these sessions is as follows:
* Residents must develop a comprehensive understanding of the indications, contraindications, limitations, complications, techniques, and interpretation of results of those technical procedures integral to the discipline
* Residents must acquire knowledge of and skill in educating patients about the technique, rationale and ramifications of procedures and in obtaining procedure-specific informed consent. Faculty supervision of residents in their performance is required, and each resident's experience in such procedures must be documented by the program director.
* Residents must have instruction in the evaluation of neurosurgical literature, clinical epidemiology, clinical study design, relative and absolute risks of disease, neurosurgical statistics and neurosurgical decision-making.
* Training must include cultural, social, family, behavioral and economic issues, such as confidentiality of information, indications for life support systems, and allocation of limited resources.
* Residents must be taught the social and economic impact of their decisions on patients, the primary care physician and society. This can be achieved by attending the bioethics lectures
* Residents should have instruction and experience with patient counseling skills and community education.
* Residents should have experience in the performance of neurosurgery related clinical laboratory and radionuclide studies and basic laboratory techniques, including quality control, quality assurance and proficiency standards

**3. Annual Grand Meeting**

* Once a year all residents enrolled for MS Neurosurgery should be invited to the annual meeting at RMU Rawalpindi.
* One full day will be allocated to this event. All the chief residents from affiliated institutes will present their annual reports. Issues and concerns related to their relevant courses will be discussed. Feedback should be collected and suggestions should be sought in order to involve residents in decision making.
* The research work done by residents and their literary work may be displayed.
* In the evening an informal gathering and dinner can be arranged. This will help in creating a sense of belonging and ownership among students and the faculty.

***TOOLS OF ASSESSMENT FOR THE COURSE( A CRISP DETAIL)***

* **360-DEGREE EVALUATION INSTRUMENT-MULTI-SOURCE FEEDBACK (MSF):**

360-degree evaluations consist of measurement tools completed by multiple people in a person’s sphere of influence. Evaluators completing rating forms in a 360-degree evaluation usually are superiors, peers, subordinates, and patients and families. Most 360-degree evaluation processes use a survey or questionnaire to gather information about an individual’s performance on several topics (e.g., teamwork, communication, management skills & decision-making). Most 360-degree evaluations use rating scales to assess how frequently a behavior is performed (e.g., a scale of 1 to 5, with 5 meaning “all the time” and 1 meaning “never”). The ratings are summarized for all evaluators by topic and overall to provide feedback .Evaluators provide more accurate and less lenient ratings when the evaluation is intended to give formative feedback rather than summative evaluations. A 360-degree evaluation can be used to assess interpersonal and communication skills, professional behaviors, and some aspects of patient care and systems-based practice.

* **CHART STIMULATED RECALL ORAL EXAMINATION (CSR)**

In a chart stimulated recall (CSR) examination patient cases of the examinee (resident) are assessed in a standardized oral examination. A trained and experienced physician examiner questions the examinee about the care provided probing for reasons behind the work-up, diagnoses, interpretation of clinical findings, and treatment plans. The examiners rate the examinee using a well-established protocol and scoring procedure. In efficiently designed CSR oral exams each patient case (test item) takes 5 to 10 minutes. A typical CSR exam is two hours with one or two physicians as examiners per separate 30 or 60-minute session. These exams assess clinical decision-making and the application or use of neurosurgical knowledge with actual patients.

* **CHECKLIST EVALUATION**

Checklists consist of essential or desired specific behaviors, activities, or steps that make up a more complex competency or competency component. Typical response options on these forms are a check ( ) or “yes” to indicate that the behavior occurred or options to indicate the completeness (complete, partial, or absent) or correctness (total, partial, or incorrect) of the action. The forms provide information about behaviors but for the purpose of making a judgment about the adequacy of the overall performance, standards need to be set that indicate, for example, pass/fail or excellent, good, fair, or poor performance. Checklists are useful for evaluating any competency and competency component that can be broken down into specific behaviors or actions. Documented evidence for the usefulness of checklists exists for the evaluation of patient care skills (history and physical examination, procedural skills) and for interpersonal and communication skills. Checklists have also been used for self-assessment of practice-based learning skills (evidence-based medicine). Checklists are most useful to provide feedback on performance because checklists can be tailored to assess detailed actions in performing a task.

* **OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE)**

In an objective structured clinical examination (OSCE) one or more assessment tools are administered at 12 to 20 separate standardized patient encounter stations, each station lasting 10-15 minutes. Between stations candidates may complete patient notes or a brief written examination about the previous patient encounter. All candidates move from station to station in sequence on the same schedule. Standardized patients are the primary assessment tool used in OSCEs, but OSCEs have included other assessment tools such as data interpretation exercises using clinical cases and clinical scenarios with mannequins, to assess technical skills. OSCEs have been administered in most of the neurosurgical schools worldwide, many residency programs, and by the licensure board examinations. The OSCE format provides a standardized means to assess: physical examination and history taking skills; communication skills with patients and family members, breadth and depth of knowledge; ability to summarize and document findings; ability to make a differential diagnosis, or plan treatment; and clinical judgment based upon patient notes.

* **PROCEDURES (OPERATIONS), OR CASE LOGS**

Procedures (operative), or case logs document each patient encounter by neurosurgical conditions seen, surgical operation or procedures performed. The logs may or may not include counts of cases, operations, or procedures. Patient case logs currently in use involve recording of some number of consecutive cases in a designated time frame. Operative logs in current use vary; some entail comprehensive recording of operative data by CPT code while others require recording of operations or procedures for a small number of defined categories.

Logs of types of cases seen or procedures performed are useful for determining the scope of patient care experience. Regular review of logs can be used to help the resident track what cases or procedures must be sought out in order to meet residency requirements or specific learning objectives. Patient logs documenting clinical experience for the entire residency can serve as a summative report of that experience; as noted below, the numbers reported do not necessarily indicate competence.

* **PATIENT SURVEYS**

Surveys of patients to assess satisfaction with hospital, clinic, or office visits typically include questions about the physician’s care. The questions often assess satisfaction with general aspects of the physician’s care, (e.g., amount of time spent with the patient, overall quality of care, physician competency (skills and knowledge), courtesy, and interest or empathy). More specific aspects of care can be assessed including: the physician’s explanations, listening skills and provision of information about examination findings, treatment steps, and drug side effects. A typical patient survey asks patients to rate their satisfaction with care using rating categories (e.g., poor, fair, good, very good, excellent) or agreement with statements describing the care (e.g., “the doctor kept me waiting,” --Yes, always; Yes, sometimes; or No, never or hardly ever). Each rating is given a value and a satisfaction score calculated by averaging across responses to generate a single score overall or separate scores for different clinical care activities or settings. Patient feedback accumulated from single encounter questionnaires can assess satisfaction with patient care competencies (aspects of data gathering, treatment, and management; counseling, and education; preventive care); interpersonal and communication skills; professional behavior; and aspects of systems-based practice (patient advocacy; coordination of care). If survey items about specific physician behaviors are included, the results can be used for formative evaluation and performance improvement. Patient survey results also can be used for summative evaluation, but this use is contingent on whether the measurement process meets standards of reliability and validity.

* **PORTFOLIOS**

A portfolio is a collection of products prepared by the resident that provides evidence of learning and achievement related to a learning plan. A portfolio typically contains written documents but can include video- or audio-recordings, photographs, and other forms of information. Reflecting upon what has been learned is an important part of constructing a portfolio. In addition to products of learning, the portfolio can include statements about what has been learned, its application, remaining learning needs, and how they can be met. In graduate neurosurgical education, a portfolio might include a log of clinical procedures performed; a summary of the research literature reviewed when selecting a treatment option; a quality improvement project plan and report of results; ethical dilemmas faced and how they were handled; a computer program that tracks patient care outcomes; or a recording or transcript of counseling provided to patients. Portfolios can be used for both formative and summative evaluation of residents. Portfolios are most useful for evaluating mastery of competencies that are difficult to evaluate in other ways such as practice-based improvement, use of scientific

evidence in patient care, professional behaviors, and patient advocacy. Teaching experiences, morning report, patient rounds, individualized study or research projects are examples of learning experiences that lend themselves to using portfolios to assess residents.

* **RECORD REVIEW**

Trained staff in an institution’s neurosurgical records department or clinical department perform a review of patients’ paper or electronic records. The staff uses a protocol and coding form based upon predefined criteria to abstract information from the records, such as medications, tests ordered, procedures performed, and patient outcomes. The patient record findings are summarized and compared to accepted patient care standards. Standards of care are available for more than 1600 diseases on the Website of the Agency for HealthCare Research and Quality (<http://www.ahrq.gov/>).Record review can provide evidence about clinical decision making, follow-through in patient management and preventive health services, and appropriate use of clinical facilities and resources (e.g., appropriate laboratory tests and consultations). Often residents will confer with other clinical team members before documenting patient decisions and therefore, the documented care may not be directly attributed to a single resident but to the clinical team.

* **SIMULATIONS AND MODELS**

Simulations used for assessment of clinical performance closely resemble reality and attempt to imitate but not duplicate real clinical problems. Key attributes of simulations are that: they incorporate a wide array of options resembling reality, allow examinees to reason through a clinical problem with little or no cueing, permit examinees to make life-threatening errors without hurting a real patient, provide instant feedback so examinees can correct a mistaken action, and rate examinees’ performance on clinical problems that are difficult or impossible to evaluate effectively in other circumstances. Simulation formats have been developed as paper-and pencil branching problems (patient management problems or PMPs), computerized versions of PMPs called clinical case simulations (CCX®), role-playing situations (e.g., standardized patients (SPs), clinical team simulations), anatomical models or mannequins, and combinations of all three formats. Mannequins are imitations of body organs or anatomical body regions frequently using pathological findings to simulate patient disease. The models are constructed of vinyl or plastic sculpted to resemble human tissue with imbedded electronic circuitry to allow the mannequin to respond realistically to actions by the examinee. Virtual reality simulations or environments (VR) use computers sometimes combined with anatomical models to mimic as much as feasible realistic organ and surface images and the touch sensations (computer generated haptic responses) a physician would expect in a real patient. The VR environments allow assessment of procedural skills and other complex clinical tasks that are difficult to assess consistently by other assessment methods. Simulations using VR environments have been developed to train and assess surgeons performing arthroscopy of the knee and other large joints, anesthesiologists managing life-threatening critical incidents during surgery, surgeons performing wound debridement and minor surgery, and neurosurgical students and residents responding to cardio-pulmonary incidents on a full-size human mannequin. Written and computerized simulations have been used to assess clinical reasoning, diagnostic plans and treatment for a variety of clinical disciplines as part of licensure and certification examinations. Standardized patients as simulations are described elsewhere.

* **STANDARDIZED ORAL EXAMINATION**

The standardized oral examination is a type of performance assessment using realistic patient cases with a trained physician examiner questioning the examinee. The examiner begins by presenting to the examinee a clinical problem in the form of a patient case scenario and asks the examinee to manage the case. Questions probe the reasoning for requesting clinical findings, interpretation of findings, and treatment plans. In efficiently designed exams each case scenario takes three to five minutes. Exams last approximately 90 minutes to two and one-half hours with two to four separate 30 or 60-minute sessions. One or two physicians serve as examiners per session. An examinee can be tested on 18 to 60 different clinical cases. These exams assess clinical decision making and the application or use of neurosurgical knowledge with realistic patients. Multiple-choice questions are better at assessing recall or understanding of neurosurgical knowledge.

* **STANDARDIZED PATIENT EXAMINATION (SP)**

Standardized patients (SPs) are well persons trained to simulate a neurosurgical condition in a standardized way or actual patients who are trained to present their condition in a standardized way. A standardized patient exam consists of multiple SPs each presenting a different condition in a 10-12 minute patient encounter. The resident being evaluated examines the SP as if (s) he were a real patient, (i.e., the resident might perform a history and physical exam, order tests, provide a diagnosis, develop a treatment plan, or counsel the patient). Using a checklist or a rating form, a physician observer or the SPs evaluate the resident’s performance on appropriateness, correctness, and completeness of specific patient care tasks and expected behaviors (See description of Checklist Evaluation…). Performance criteria are set in advance. Alternatively or in addition to evaluation using a multiple SP exam, individual SPs can be used to assess specific patient care skills. SPs are also included as stations in Objective Structured Clinical Examinations (See description of OSCE).SPs have been used to assess history-taking skills, physical examination skills, communication skills, differential diagnosis, laboratory utilization, and treatment. Reproducible scores are more readily obtained for history-taking, physical examination, and communication skills. Standardized patient exams are most frequently used as summative performance exams for clinical skills. A single SP can assess targeted skills and knowledge.

* **WRITTEN EXAMINATION (MCQ)**

Written or computer-based MCQ examination is composed of multiple-choice questions (MCQ) selected to sample neurosurgical knowledge and understanding of a defined body of knowledge, not just factual or easily recalled information. Each question or test item contains an introductory statement followed by four or five options in outline format. The examinee selects one of the options as the presumed correct answer by marking the option on a coded answer sheet. Only one option is keyed as the correct response. The introductory statement often presents a patient case, clinical findings, or displays data graphically. A separate booklet can be used to display pictures, and other relevant clinical information. In computer-based examinations the test items are displayed on a computer monitor one at a time with pictures and graphical images also displayed directly on the monitor. In a computer-adaptive test fewer test questions are needed because test items are selected based upon statistical rules programmed into the computer to quickly measure the examinee’s ability. Neurosurgical knowledge and understanding can be measured by MCQ examinations. Comparing the test scores on in-training examinations with national statistics can serve to identify strengths and limitations of individual residents to help them improve. Comparing test results aggregated for residents in each year of a program can be helpful to identify residency training experiences that might be improved.

* **Mini-Clinical Evaluation Exercise (mini-CEX**)

This tool evaluates a clinical encounter with a patient to provide an indication of competence in skills essential for good clinical care such as history taking, examination and clinical reasoning. The trainee receives immediate feedback to aid learning. This can be used at any time and in any setting when there is a trainee and patient interaction and an assessor is available.

* **Direct Observation of Procedural Skills (DOPS)**

DOPS is an assessment tool designed to evaluate the performance of a trainee in undertaking a practical procedure, against a structured checklist. The trainee receives immediate feedback to identify strengths and areas for development.

* **Case-based Discussion (CBD)**

The CBD assesses the performance of a trainee in their management of a patient to provide an indication of competence in areas such as clinical reasoning, decision-making and application of neurosurgical knowledge in relation to patient care. It also serves as a method to document conversations about, and presentations of, cases by trainees. The CBD should focus on a written record (such as written case notes, out-patient letter, and discharge summary). A typical encounter might be when presenting newly referred patients in the outpatient department.

* **Acute Care Assessment Tool (ACAT)**

The ACAT is designed to assess and facilitate feedback on a doctor’s performance during their practice on the Acute Neurosurgical Take. Any doctor who has been responsible for the supervision of the Acute Neurosurgical Take can be the assessor for an ACAT.

* **Audit Assessment (AA)**

The Audit Assessment tool is designed to assess a trainee’s competence in completing an audit. The Audit Assessment can be based on review of audit documentation OR on a presentation of the audit at a meeting. If possible the trainee should be assessed on the same audit by more than one assessor.

* **Teaching Observation (TO)**

The Teaching Observation form is designed to provide structured, formative feedback to trainees on their competence at teaching. The Teaching Observation can be based on any instance of formalized teaching by the trainee who has been observed by the assessor. The process should be trainee-led (identifying appropriate teaching sessions and assessors).

**Entrustable Professional Activities (EPAs)**

**MS Neurosurgery**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | PGY-1 | | PGY-2 | | PGY-3 | | PGY-4 | | PGY-5 | |
| EPA | No | EPA | No | EPA | No | EPA | No | EPA | No |
| CLINICAL COMPETENCIES | | | | | | | | | | |
| History Taking | C | **2** | C | **3** | C, A | **4** | C, A | **4** | C, A | **4** |
| Physical Examination | P | **1** | P | **2** | P | **4** | P | **4** | P | **4** |
| Ordering Investigations | C | **2** | C | **2** | C | **4** | C | **4** | C | **4** |
| Performing Myelography | P | **1** | P | **2** | P | **2** | P | **3** | P | **4** |
| Interpreting Results of tests | C | **1** | C | **2** | C | **3** | C | **4** | C | **4** |
| Surgical decision making | C | **2** | C | **2** | C | **3** | C | **4** | C | **4** |
| Burr hole | P | **1** | P | **2** | P | **3** | P | **4** | P | **4** |
| VP shunt | P | **1** | P | **2** | P | **2** | P | **4** | P | **4** |
| Ventricular Drain | P | **1** | P | **2** | P | **3** | P | **4** | P | **4** |
| Elevation of Depressed fracture | P | **1** | P | **2** | P | **3** | P | **4** | P | **4** |
| Spinal Decompression | P | **1** | P | **2** | P | **2** | P | **3** | P | **4** |
| Lumbar Discectomy | P | **1** | P | **2** | P | **2** | P | **3** | P | **4** |
| Carries spine | C | **1** | C | **2** | C | **2** | C, P | **3** | C, P | **3** |
| Craniotomy foe EDH/SDH | P | **1** | P | **1** | P | **2** | P | **3** | P | **4** |
| Cervical Decompression | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Spinal Tumors | C, P | **1** | C, P | **1** | C, P | **2** | C, P | **2** | C, P | **3** |
| Gliomas | C, P | **1** | C, P | **1** | C, P | **2** | C, P | **2** | C, P | **3** |
| Brain Abscess | P | **1** | P | **2** | P | **2** | P | **3** | P | **4** |
| Spinal Fusion | P | **1** | P | **2** | P | **2** | P | **3** | P | **4** |
| Spinal Instrumentation | P | **1** | P | **2** | P | **2** | P | **3** | P | **4** |
| Trigeminal Rhizotomies | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Cervical Prolapsed disc | P | **1** | P | **2** | P | **2** | P | **3** | P | **4** |
| Syringomyelia | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Meningiomas | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Aneurysm Surgery | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Cerebellopontine angle tumors | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Brain stem tumors | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Arteriovenous malformations | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Orbital Tumors | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Skull Base tumors | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Pituitary tumors | P | **1** | P | **2** | P | **2** | P | **3** | P | **3** |
|  |  |  |  |  |  |  |  |  |  |  |
| Craniopharyngioma | P | **1** | P | **1** | P | **2** | P | **2** | P | **3** |
| Cranioplasty | P | **1** | P | **1** | P | **2** | P | **3** | P | **4** |

# **SECTION IV FRAMEWORK OF ASSESSMENT**

***MID-TERM ASSESMENT (MTA) M.S. Neurosurgery:***

All candidates admitted in M.S. Neurosurgery courses shall appear in MID-TERM ASSESMENT *(MTA)*after completion of second calendar year.

**Eligibility Criteria:**

The candidates appearing in Intermediate Examination of the M.S. Neurosurgery Programme are required:

a) To have submitted certificate of completion of workshops.

b) To have submitted certificate of completion of first two years of training from the supervisor/ supervisors of rotations.

c) To have submitted continuous internal assessment proforma from his/her own supervisor on 03 monthly basis and also from his/her supervisors during rotation, achieving a cumulative score of 75%.

d) To have submitted evidence of payment of examination fee.

**Intermediate Examination Schedule and Fee:**

a) Intermediate Examination at completion of two years training, will be held twice a year.

b) There will be a minimum period of 30 days between submission of application for the examination and the conduction of examination.

c) Examination fee will be determined periodically by the University.

d) The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.

e) The Controller of Examinations will issue Roll Number Slips on receipt of prescribed application form, documents satisfying eligibility criteria and evidence of payment of examination fee.

**Details of Marks Distribution for MIDTERM ASSESMENT**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. no** | **COMPONENTS OF EXAM** | **DETAIL OF COMPONENT FOR EXAM** | **No. OF ITEMS** | **ALLOTED TIME** | **REMARKS** | **MARKS PER ITEM** | | **TOTAL MARKS** | **PASS**  **%AGE AND MARKS** |
| **1.** | WRITTEN THEORY PAPER(150MARKS) | Paper I | Case based 75 MCQs | 150 mins | - | 2 | | 150 | 60% of 300= 180 Marks |
| Paper II | Case based 75 MCQs | 150 mins | - | 2 | | 150 |
| **2.** | OSCE | OSCE | 15 | 5 mins/ station=75 mins | - | 10 | | 150 | 60% of 150=90 marks |
| **3.** | Internal assesment | Internal assesment | **1** | **-** | **-** | 150 | | 150 | 60% of 150= 90 marks |
| **Total** | | | | | | | **600** | | **60%= 360 marks** |

**TABLE OF SPECIFICATIONS (TOS) Calgary Model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Paper I (MCQs)** | | | | |
| S.No. | | **Table of Specifications** | **MCQs** | |
| 1 | | Head and neck swellings | 05 | |
| 2 | | ATLS and torso trauma | 15 | |
| 3 | | Burn and degloving injuries | 05 | |
| 4 | | Acute abdomen | 05 | |
| 5 | | Abdominal wall hernias | 02 | |
| 6 | | Surgical Site Infections | 10 | |
| 7 | | Nutrition and fluid balance | 07 | |
| 8 | | Perioperative and icu care | 06 | |
| 9 | | Peripheral vascular disorders | 03 | |
| 10 | | Orthopedics | 10 | |
| 11 | | Medicolegal issues | 02 | |
| 12 | | Blood products and organ transplantation | 02 | |
| 13 | | GI and Hepatobiliary disorders | 03 | |
|  | | **TOTAL 75**  **Paper II (MCQs)** | | |
| **S.No** | **Table of Specifications** | | | **MCQs** |
| **1** | Epilepsy basic management | | | 02 |
| **2** | Head trauma | | | 15 |
| **3** | Spine trauma | | | 10 |
| **4** | Hydrocephalus | | | 05 |
| **5** | Craniospinal anomalies | | | 06 |
| **6** | Sodium homeostasis | | | 03 |
| **7** | Brain abscess and meningitis | | | 05 |
| **8** | SAH and management | | | 05 |
| **9** | Brain Tumors(basics) | | | 05 |
| **10** | ICP Monitoring | | | 02 |
| **11** | Basic neuroanatomy | | | 06 |
| **12** | Coma& Brain Death | | | 02 |
| **13** | Lumbar disc disease | | | 04 |
| **14** | Basic neuroradiology | | | 05 |
|  | **TOTAL 75** | | | |

**Topic wise distribution of OSCE Stations( All Interactive)**

|  |  |  |
| --- | --- | --- |
| **Station**  **No.** | **Station Description** | **Unit** |
| 1 | **CT scan, xray of trauma patient**  CT scan or xray focusing the diagnosis will be shown to the Candidate.  Questions will focus relevant findings, diagnosis, etiology, treatment and complications etc. | Neuroradiology  investigations focusing on above mentioned diagnosis will be shown to the Candidate.  Questions will focus relevant findings, diagnosis, etiology, treatment and complications etc |
| **2** | **Emergency Scenario Brain /Spine Injury**  Head/Spine injury ATLS component | Emergency/ Neurotrauma  *Candidate will be provided scenario focusing ATLS component.*  *He will be observed by Examiner for managing the issue.*  *Relevant questions will be asked.* |
| **3.** | **Procedure on Simulator:**  Lumbar Puncture, , cervical traction, ETT placement, EVD, burr hole , craniotomy, EDH evacuation, lumber drain placement | Assessment of skills  *Candidate will be asked to perform one of the procedures. technique/procedural skills will be evaluated by Examiner.*  *Questions will focus procedure, indication, contraindications, and complications etc.* |
| **4.** | **Basic Neurosurgical Planning and approach on Skull/ Spine model**  Cranial/Spine surgery planning according to scenario presented and diagnosis formed by candidate | Cranial Procedures  *Clinical scenario with complete investigations and diagnosis presented, Surgical procedure approach, incision marking, steps of surgery and complications* |
| **5.** | **Identification of picture/video**  **Hydrocephalus and neural tube defects** | Interpretation of Findings  *Above mentioned topics will be shown to the candidates in pictorial form. Question will be asked regarding diagnostic, management issues and complication.* |
| **Rest of the stations will be formulated by General surgery** | | |

***FINAL TERM ASSESSMENT (FTA) MS NEUROSURGERY***

**After completion of five Calendar years of the Programme**

**Eligibility Criteria:**

To appear in the Final Examination the candidate shall be required:

a) To have submitted the result of passing Intermediate Examination.

b) To have submitted the certificate of completion of training, issued by the Supervisor .

c) To have achieved a cumulative score of 75% in Continuous Internal assessments of all training years.

d) To have got the thesis accepted and will then be eligible to appear in Final Examination.

e) To have submitted no dues certificate from all relevant departments including library, hostel, cashier etc.

f) To have submitted evidence of submission of examination fee.

**Final Examination Schedule and Fee**

a) Final examination will be held twice a year.

b) The candidates have to satisfy eligibility criteria before permission is granted to take the examination.

c) Examination fee will be determined and varied at periodic intervals by the University.

d) The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.

e) The Controller of Examinations will issue an Admittance Card with a photograph of the candidate on receipt of prescribed application form, documents satisfying eligibility criteria and evidence of payment of examination fee. This card will also show the Roll Number, date / time and venue of examination.

**Details of Marks Distribution for FINAL EXAMINATION:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S. no** | **COMPONENTS OF EXAM** | **DETAIL OF COMPONENT FOR EXAM** | **No. OF ITEMS** | **ALLOTED TIME** | **REMARKS** | **MARKS PER ITEM** | **TOTAL MARKS** | **PASS**  **%AGE AND MARKS** |
| **1.** | WRITTEN THEORY PAPER(200MARKS) | Paper I | Case based 100 MCQs | 150 mins | - | 1 | 100 | 60% of 200=120 |
| Paper II | Case based 100 MCQs | 150 mins | - | 1 | 100 |
| **2.** | OSCE | OSCE | 15 | 5 mins/ station=75 mins | - | 10 | 150 | 60% of 450=270 marks |
| **3.** | Clinical assesment | Long case | 1 | 60 mins= 30 mins history & examination,30 mins viva | - | 100 | 100 |
| Short case | 4 | 10 mins/case | - | 50 | 200 |
| **4.** | DEFENSE OF THESIS( 100 MARKS) | Presentation and defense | 1 | 10 mins presentation, 20 mins defense | - | Presentation 30 marks, defense 70 marks | 100 | 60%of 100=60 marks |
| **Total** | | | | | | | **750** | **60% of 750= 450 marks** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **TABLE OF SPECIFICATIONS (TOS)** | | | | |
| Marks Distribution | Units/Topics | No. of  Questions/ Stations | Eligibility for Exam | Research |
| **WRITTEN & CLINICAL- TOTAL MARKS 750**  ***Written- Two papers***  Paper I will comprise 100 single best answer type Multiple Choice Questions. 1 mark each for each MCQ  (MCQs).  (2hoursand30mins)  Paper 2will also comprise of 100 single best answer type Multiple Choice Questions. 1 mark each for each MCQ  (MCQs).  (2hoursand30mins)  ***Both papers will be conducted on two separate days.***  *Written exam should be passed to appear in clinical exam.*  **Clinical:**  OSCE=150 marks  (15 stations 10 Marks each)  5 min for each station  **Short cases**- 200 marks (4 cases 50 marks each) 10 min each  **Long case**- 100 marks (1 long case) 60 min duration  **Thesis** = 100 marks Presentation – 30 Marks Discussion- 70 Marks  Pass percentage= Accumulative pass percentage is 60% overall and in each components i.e.1) paper I, II, 2) OSCE 3) Short cases, and Long case, and 4) Thesis | **Paper I- MCQs** | | 1. Completion of 5 years training 2. Year One,MTA,Yearthree and year four Assessment should be passed. 3. All internaland external rotations to be completed. 4. Cumulative score of 75% in Continuous Internal assessments of all training years. 5. No dues certificate. | Thesis should be accepted. |
| 1. Neuroanatomy amd physiology | 15 |
| 1. Head injury | 20 |
| 1. Spinal trauma | 20 |
| 1. Pediatric neurosurgery | 20 |
| 1. Infectious diseases of brain and spine | 15 |
| 1. Neuroradiology | 10 |
| **Paper ll- MCQs** | |
| 1. Brain tumor and spinal tumor | 20 |
| 1. Spinal degenerative disease | 18 |
| 1. Neurovascular disorder | 15 |
| 1. Neurology | 07 |
| 1. Functional neurosurgery,Skull base surgery | 07 |
| 1. Epilepsy | 5 |
| 1. Peripheral nerves | 10 |
| 1. Neuropathic pain | 08 |
| 1. Homeostasis, osmolality, Neuro ICU care | 10 |
| **Clinical** | |
| OSCE | 15 stations |
| Short cases | 4 cases |
| Long Cases | 1 case |
| **Thesis** | |
| Thesis | 1 |
|  | |

**Topic wise distribution of OSCE Stations( All Interactive)**

|  |  |  |
| --- | --- | --- |
| **Station**  **No.** | **Station Description** | **Unit** |
| 1 | **CT scan CTA and MRI**  CT scan or MRI focusing the diagnosis will be shown to the Candidate.  Questions will focus relevant findings, diagnosis, etiology, treatment and complications etc. | Neuroradiology  2 investigations focusing on above mentioned diagnosis will be shown to the Candidate.  Questions will focus relevant findings, diagnosis, etiology, treatment and complications etc |
| 2 | **X-ray, SPECT,PET scan**  Focusing the diagnosis will be shown to the Candidate.  Questions will focus on relevant findings, diagnosis, etiology, treatment and complications etc. | Neuro radiology  2 X-Ray,SPECT or PET scan focusing above mentioned diagnosis will be shown to the Candidate.  Questions will focus relevant findings, diagnosis, etiology, treatment and complications etc |
| 3. | **Diagnostic investigations Station**  CSF Routine examination ,EEG ,EMG,NCS ,electrolyte imbalance  Results of one of above mentioned investigation will be shown to the Candidate. | Lab interpretation  *Results of one of above-mentioned investigation will be shown to the Candidate.*  *Questions will focus relevant findings, diagnosis, etiology,treatment and complications etc.* |

|  |  |  |
| --- | --- | --- |
| 4. | **Identification of the instrument**  Instruments used in emergency and elective surgeries will be shown to the candidate like gardener Welles tongs, aneurysm clips, cranial and spinal endoscopes, stereotactic frame etc.  Question will focus on techniques, hardware handling and complication. | Neurosurgical instruments  *Candidate will be provided one of medication or Instrument.*  *Questions will focus utilization, indication, contraindications, procedure (where relevant) and complications etc.* |
| 5. | **Emergency Scenario Brain /Spine Injury**  Head/Spine injury ATLS component | Emergency/ Neurotrauma  *Candidate will be provided scenario focusing ATLS component.*  *He will be observed by Examiner for managing the issue.*  *Relevant questions will be asked.* |
| 6, | **Neuro-ICU scenario**  Scenario based on critically ill neurosurgical patient and management  SIADH, CSW, ABGs imbalance, tracheostomy care, cervical traction care, general nursinh care, ventilator setup and its operation | ICU care  *Lab results, ventilator and subject will be provided to the candidate. Candidate will be asked to interpret lab results, setup ventilator and perform care of subject as asked.* |

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| 7-9 | **Procedure on Simulator:**  Lumbar Puncture, , cervical traction,Pedicle screws placement. Lateral mass screw placement, laminectomy, Lumber discectomy, Anterior Cervical Discectomy, artificial cervical disc placement, cervical plate placement fixation., meningocele repair, Dethering of teethered cord | Assessment of skills  *Candidate will be asked to perform one of the procedures. Mannerism, technique/procedural skills will be evaluated by Examiner.*  *Questions will focus procedure, indication, contraindications, and complications etc.* |
| 10. | **Identification of the condition (Video/picture)**  Picture/video of malformation like hydrocephalus, neural tube defect, craniosynostosis, neurofibromatosis, sturge weber syndrome, retinoblastoma, Facial Plasy ,ptosis, torticollis. Tardy ulnar palsy, movement disorders, epileptic fit, nystagmus, pathological gait, tics, hemifacial spasm | Interpretation of Findings  *Above mentioned topics will be shown to the candidates in pictorial form. Question will be asked regarding diagnostic, management issues and complication.* |
| 11-13 | **Procedure on Simulator:**  Tracheostomy*,* ETT placement, EVD, burr hole craniostomy for chronic subdural hematoma, craniotomy, decompressive craniectomy, aneurysm clipping, VP shunt placement, encephalocele repair, brain biopsy, brain abscess drainage, acute subdural hematoma evacuation, EDH evacuation, ICH evacuation, craniovertebral decompression, cortisectomy | Assessment of skills  *Candidate will be asked to perform one of the procedures. Mannerism, technique/procedural skills will be evaluated by Examiner.*  *Questions will focus procedure, indication, contraindications, and complications etc* |
| 14 | **Neurosurgical Planning and approach on Skull model**  Cranial surgery planning according to scenario presented and diagnosis formed by candidate | Cranial Procedures  *Clinical scenario with complete investigations and diagnosis presented, Surgical procedure approach, incision marking, steps of surgery and complications* |
| 15 | **Neurosurgical Planning and approach on Spine model**  Spine surgery planning according to scenario presented and diagnosis formed by candidate | Spinal Procedures  *Clinical scenario with complete investigations and diagnosis presented, Surgical procedure approach, incision marking, steps of surgery and complications* |

**Declaration of Results**

For the declaration of result

I. The candidate must get his Thesis accepted.

II. The candidate must have passed the final written examination with 60 % marks and the clinical & oral examination securing 60% marks.

III. MS degree shall be awarded after acceptance of thesis and success in the final examination.

IV. On completion of stipulated training period, irrespective of the result (pass or fail) the training slot of the candidate shall be declared vacant.

# **SECTION-V CURRICULUM OF MS NEUROSURGERY**

***DETAILS OF CURRICULUM OF MS NEUROSURGERY PROGRAM***

***RAWALPINDI MEDICAL UNIVERSITY RAWALPINDI***

***Curriculum of 1st year MS Neurosurgery***

Refer to Section II;

* Basic sciences,
* Fundamental principles of Surgery

***Curriculum of 2ndyear MS Neurosurgery***

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| **TOPICS TO BE TAUGHT** | **LEARNING OBJECTIVES**  **Student should be able to know:** | **TEACHING METHOD** | **ASSESSMENT** |
| **History Taking**  **(Knowledge)** | * To progressively develop the ability to obtain a relevant focused history from increasingly complex patients and challenging circumstances * To record accurately and synthesize history with clinical examination and formulation of management plan according to likely clinical evolution * Recognizes the importance of different elements of history * Recognizes the importance of clinical (particularly cognitive impairment), psychological, social, cultural and nutritional factors particularly those relating to ethnicity, race, cultural or religious beliefs and preferences, sexual orientation, gender and disability * Recognizes that patients do not present history in structured fashion and that the history may be influenced by the presence of acute and chronic neurosurgical conditions * Knows likely causes and risk factors for conditions relevant to mode of presentation * Recognizes that history should inform examination, investigation and management | Bedside teaching in  wards and outpatient departments | mini-CEX |
| **History Taking**  **(Skills)** | * Identify and overcome possible barriers (e.g. cognitive impairment) to effective communication * Manage time and draw consultation to a close | Bedside teaching in  wards and outpatient | mini-CEX |

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|  | •  •  •  •  • | appropriately  Supplement history with standardized instruments or questionnaires when relevant  Manage alternative and conflicting views from family, careers and friends  Assimilate history from the available information from patient and other sources  Recognize and interpret the use of non-verbal communication from patients and careers  Focus on relevant aspects of history | departments |  |
| **History Taking**  **(Behaviors)** | • | Show respect and behave in accordance with Good Neurosurgical Practice | Bedside teaching in  wards and outpatient departments | mini-CEX |
| **Clinical examination (knowledge)** | •  •  •  •  • | To progressively develop the ability to perform focused and accurate clinical examination in increasingly complex patients and challenging circumstances  To relate physical findings to history in order to establish diagnosis and formulate a management plan  Understand the need for a valid clinical examination Understand the basis for clinical signs and the relevance of positive and negative physical signs Recognize constraints to performing physical examination and strategies that may be used to overcome them  Recognize the limitations of physical examination and the need for adjunctive forms of assessment to confirm diagnosis | Bedside teaching in  wards and outpatient departments | CBD  mini-CEX |
| **Clinical examination**  (Skills) | • | Perform an examination relevant to the presentation | Bedside teaching in | CBD |

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|  | •  •  •  • | | | and risk factors that is valid, targeted and time efficient Recognize the possibility of deliberate harm in  vulnerable patients and report to appropriate agencies Interpret findings from the history, physical examination and mental state examination, appreciating the importance of clinical, psychological,  religious, social and cultural factors  Actively elicit important clinical findings  Perform relevant adjunctive examinations including cognitive examination such as Mini Mental state Examination (MMSE) and Abbreviated Mental Test  Score (AMTS) | | wards and outpatient departments | | mini-CEX |
| **Clinical examination**  **(Behaviors)** | • | | | Show respect and behaves in accordance with Good Neurosurgical Practice | | Bedside teaching in  wards and outpatient departments | | CBD, miniCEX, |
| **Time management and decision making** | • | | | To become increasingly able to prioritize and organize clinical and clerical duties in order to optimize patient care. To become increasingly able to make appropriate clinical and clerical decisions in order to optimize the effectiveness of the clinical team resource | | Bedside teaching in  wards and outpatient departments | | CBD, miniCEX |
| **Decision making and clinical reasoning** | •  •  • | | | To progressively develop the ability to formulate a diagnostic and therapeutic plan for a patient according to the clinical information available  To progressively develop the ability to prioritize the diagnostic and therapeutic plan  To be able to communicate the diagnostic and therapeutic plan appropriately | | Bedside teaching in wards & OPD | | CBD,  mini-CEX |
| **Gross Anatomy Cranium and spine** | |  | Students should be able to   * Cortical surface anatomy * Central sulcus on axial imaging * Surface anatomy of the cranium * Surface landmarks of spine levels * Cranial foramina and their contents * Internal capsule * Cerebellopontine angle anatomy * Occipitoatlantoaxial-complex anatomy * Spinal cord anatomy. | | LGIS | | MCQs , SAQs | |
| **Vascular Anatomy** | |  | * Cerebral vascular territories * Cerebral vascular anatomy * Cerebral venous anatomy * Spinal cord vasculature | | LGIS | | MCQs , SAQs | |
| **Neurophysiology and Regional Brain Syndrome** | |  | * Neurophysiology * Regional brain syndromes * Jugular foramen syndromes. | | LGIS | | MCQs , SAQs | |

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| **Sodium Homeostasis and osmolality** | |  | | * Serum osmolality and sodium concentration * Hyponatremia * Hypernatremia | PBL, SGD | MCQs, SAQs |
| **General Neuro-critical care** | |  | | * Parenteral agents for hypertension * Hypotension (Block) * Acid inhibitors * Rhabdomylysis | LGIS | MCQs & SAQs |
| **Endocrinology** | |  | | * corticosteroids * Hypothyroidism * Pituitary Embryology and neuroendocrinology | LGIS | MCQs & SAQs |
| **Hematology** | |  | | * Circulating blood volume * Blood component therapy * Anticoagulation considerations in neurosurgery * Extramedullary hematopoiesis | LGIS | MCQs & SAQs |
| **Imaging and angiography** | |  | | * CAT scan (AKA CT scan) * Magnetic resonance imaging (MRI) * Angiography * Myelography * Radionuclide scanning | LGIS, Bed Side Teaching in ward | MCQs & SAQs |
| **Plain radiology and contrast agents** | |  | | * C-Spine X-rays * Lumbosacral (LS) spine X-rays * Skull X-rays * Contrast agents in neuroradiology * Radiation safety for neurosurgeons | Bedside teaching  & SGD | MCQs & SAQs |
| **Electro-diagnostics** | |  | | * Electroencephalogram (EEG) * Evoked potential * NCS/EMG. | LGIS | MCQs & SAQs |
| **Coma** | |  | | * Coma and coma scales * Posturing * Etiologies of coma * Herniation * Hypoxic coma. | LGIS | MCQs & SAQs |
| **Brain death and organ donation** | |  | | * Brain death in adults * Brain death * Brain death in Organ and tissue donation | Bedside teaching  & SGD | MCQs & SAQs  DOPS |
| **Cerebrospinal fluid** | |  | | * General CSF characteristics * Bulk flow model * CSF constituents * Cranial CSF fistula * Spinal CSF * Meningitis in CSF * Evaluation of the patient with CSF fistula * Treatment for CSF fistula * Intracranial hypotension | LGIS | MCQs & SAQs  DOPS |
| **Hydrocephalus –general aspects** | |  | | * Basic definition * Epidemiology * Etiologies of * Signs and symptoms of HCP * CT/MRI criteria for hydrocephalus * Differential diagnosis of * Chronic HCP External hydrocephalus (AKA benign external * hydrocephalus) * X-linked * “Arrested hydrocephalus” * Entrapped fourth ventricle * Normal pressure hydrocephalus (NPH) * Hydrocephalus and pregnancy | LGIS | MCQs & SAQs  DOPS |
| **Treatment of hydrocephalus** | |  | | * Neurosurgical treatment of hydrocephalus * Spinal taps * Surgical * Endoscopic third ventriculostomy * Shunts * Shunt * Specific shunt * Surgical insertion techniques * Instructions to patients | Skill Teaching in OT  & SGD | MCQs & SAQs  DOPS |
| **Head trauma –general Information ,Grading , initial management** | |  | | * Head trauma – general * Grading * Transfer of trauma * Management in E/R * Radiographic evaluation * Admitting orders for minor or moderate head injury * Patients with associated severe systemic injuries * Exploratory burr holes. . | Bedside teaching  & SGD | MCQs & SAQs  DOPS |
| **Concussion, high altitude Cerebral Edema,Cerebrovascular injuries** | |  | | * Concussion * Other TBI definitions and concepts * High-altitude cerebral * Traumatic cervical artery dissections. | SGD | MCQs & SAQs |
| **Neuro-Monitoring in head trauma** | |  | | * General * Intracranial pressure (ICP * Adjuncts to ICP monitoring * Treatment measures for elevated ICP | Bedside teaching  & SGD | MCQs & SAQs  DOPS |
| **Skull fractures** | |  | | * Types of skull fractures * Linear skull fractures over the convexity * Depressed skull fractures * Basal skull fractures * Craniofacial fractures  Pneumocephalus | LGIS, Skill Teaching in OT | MCQs & SAQs  DOPS |
| **Traumatic hemorrhagic conditions** | |  | | * Posttraumatic parenchymal injuries * Hemorrhagic contusions * Epidural hematoma. * Acute subdural hematoma * Chronic subdural hematoma * Spontaneous subdural hematoma * Traumatic subdural hygroma * Extraaxial fluid collections in children * Traumatic posterior fossa mass lesions | Bedside teaching , SGD and skill teaching in OT | MCQs & SAQs  DOPS |
| **Pediatric head injury** | |  | | * Epidemiology of pediatric head injury and comparison to adults * Management * Outcome. * Cephal hematoma * Skull fractures in pediatric patients * Retroclival hematoma * Nonaccidental trauma (NAT) | Bedside teaching ,SGD& skill teaching in OT | MCQs & SAQs  DOPS |
| **Head injury –long term management, Complications and Outcome** |  | | * Airway management * Deep-vein thrombosis (DVT) prophylaxis * Nutrition in the head-injured patient * Posttraumatic hydrocephalus. * Outcome from head trauma * Late complications from traumatic brain injury | | LGIS& Skill teaching in OT | MCQs & SAQs  DOPS |
| **Primary craniospinal anomalies(basics)** |  | | * Neural tube defects * Dandy walker malformation * Chiari malformation | | LGIS/BED SIDE TEACHING | MCQS |
| **Epilepsy** |  | | * Classification * Anti epileptic drugs | | LGIS | MCQS |
| **Bacterial infections and meningitis** |  | | * Meningitis * Subdural empyema * Brain abscess | | LGIS | MCQS |
| **Brain tumors and classification** |  | | * Classification of nervous system tumors * Brain tumors—general clinical aspects * Pediatric brain tumors * Medications for brain tumors * Chemotherapy for brain tumors * Intraoperative pathology consultations (“frozen section) * Select commonly utilized stains in neuropathology | | LGIS | MCQS |
| **Lower back pain** |  | | * Low back pain – general information * Intervertebral disc * Nomenclature for disc pathology * Initial assessment of the patient with back pain * Radiographic evaluation * Lumbar disc herniation and radiculopathy | | LGIS | MCQQ |
| **Subarachnoid hemorrhage** |  | | * Etiology * Incidence , risk factors and clinical features * Grading * Management in ICU | | LGIS | MCQS |

***Curriculum of 3rdyear MS Neurosurgery***

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| **TOPICS TO BE TAUGHT** | **LEARNING OBJECTIVES**  **Student should be able to know:** | | | **TEACHING METHOD** | **ASSESSMENT** |
| 1. **Primary intracranial anomalies** |  | * Arachnoid cysts, intracranial * Craniofacial development * Dandy Walker malformation * Aqueductal stenosis * Agenesis of the corpus callosum * Absence of the septum pellucidum * Intracranial lipomas * Hypothalamic hamartomas | | Bedside teaching  & SGD | MCQs & SAQs  DOPS |
| 1. **Primary spinal anomalies** |  | * Spinal arachnoid cysts * Spinal dysraphism (spina bifida) * Klippel-Feil syndrome * Tethered cord syndrome * Split cord malformation * Lumbosacral nerve root anomalies | | LGIS | MCQs & SAQs  DOPS  Mini CEX |
| 1. **Primary craniospinal anomalies** |  | * Chiari malformations * Neural tube defects * Neurenteric cysts | | Bedside teaching  & SGD | MCQs & SAQs  Mini CEX DOPS |
| 1. **Bacterial infections of parenchyma and meninges and complex infections** |  | * Meningitis * Cerebral abscess * Subdural empyema * Neurologic involvement in HIV/AIDS * Lyme disease—neurologic manifestations * Nocardia brain abscess | | LGIS, Bedside Teaching | MCQs & SAQs  DOPS |
| 1. **Skull , spine and post -surgical infections** |  | * Shunt infection * External ventricular drain (EVD)-related infection * Wound infections * Osteomyelitis of the skull * Spine infections | | Bedside teaching  & SGD | MCQs & SAQs  DOPS |
| 1. **Other non- bacterial infections** |  | * Viral * Creutzfeldt-Jakob disease * Parasitic infections of the CNS * Fungal infections of the CNS * Amebic infections of the CNS . | | LGIS | MCQs & SAQs |
| 1. **Seizure classification and anti-convulsant pharmacology** |  | * Seizure classification * Antiepileptic drugs | | LGIS | MCQs & SAQs |
| 1. **Special types of seizures** |  | * New onset seizures * Posttraumatic seizures * Alcohol withdrawal seizures * Nonepileptic seizures * Febrile * Status epilepticusContents | | LGIS | MCQs & SAQs |
| 1. **Pain** |  | * Major types of pain * Neuropathic pain syndromes * Craniofacial pain syndromes * Postherpetic neuralgia * Complex regional pain syndrome (CRPS) | | Bedside teaching  & SGD | MCQs & SAQs |
| 1. **Peripheral nerves** |  | * Peripheral nerves – definitions and grading scales * Muscle innervation * Peripheral nerve injury/ | | LGIS | MCQs & SAQs  DOPS |
| 1. **Entrapment neuropathies** |  | * Entrapment neuropathy – definitions and associations * Mechanism of injury * Occipital nerve * Median nerve * Ulnar nerve * Radial nerve * Injury in the hand * Axillary nerve * Suprascapular nerve * Meralgia paresthetica * Obturator nerve entrapment * Femoral nerve * Common peroneal nerve palsy * Tarsal tunnel | | LGIS, Skill teaching in OT | MCQs & SAQs  DOPS |
| 1. **Non-Entrapment peripheral neuropathies** |  | * Etiologies of peripheral neuropathy * Classification * Clinical * Syndromes of peripheral neuropathy * Peripheral nerve injuries * Missile injuries of peripheral nerves * Thoracic outlet syndrome | | LGIS, Skill Teaching in OT | MCQs & SAQs  DOPS |
| 1. **NeuroOpthmology** |  | * Visual fields * Pupillary * Extraocular muscle (EOM) system * Neurophthalmologic syndromes * Miscellaneous neurophthalmologic signs. | | Bedside teaching  & SGD | MCQs & SAQs  DOPS |
| 1. **Neurotology** |  | * Dizziness and * Meniere’s disease * Facial nerve * Hearing loss | | LGIS | MCQs & SAQs  DOPS |
| 1. **Spine injuries---general information** |  | * Introduction * Terminology * Whiplash-associated disorders * Pediatric spine injuries * Cervical bracing * Follow-up schedule * Sports-related cervical spine injuries * Neurological assessment. * Spinal cord injuries | | LGIS & Bedside teaching | MCQs , SAQs  DOPS |
| 1. **Management of Spinal Cord Injury** |  | * Spinal trauma management – general information * Management in the field * Management in the hospital * Radiographic evaluation and initial * C-spine immobilization * Traction/reduction of cervical spine injuries * Timing of surgery following spinal cord injury | | SGD & Bedside Teaching | MCQs & SAQs  DOPS |
| 1. **Occipital-atlanto-axial Injuries (Occiput to C2**). |  | * Atlantooccipital dislocation * Occipital condyle fractures * Atlantoaxial subluxation/dislocation * Atlas (C1) fractures * Axis (C2) fractures. * Combination C1 & C2 injuries | | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Subaxial (C3 through C7) injuries and Fractures** |  | * Classification systems * Clay shoveler’s fracture * Vertical compression injuries. * Flexion injuries of the subaxial cervical spine * Distraction flexion injuries * Extension injuries of the subaxial cervical spine * Treatment of subaxial cervical spine fractures * Spinal cord injury without radiographic abnormality * (SCIWORA) | | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Thoracic , Lumbar and Sacral supine Fractures** |  | * Assessment and management of thoracolumbar * fractures. * Surgical treatment * Osteoporotic spine fractures * Sacral fractures | | LGIS, Bedside Teaching& skill teaching in OT | MCQs SAQs  miniCEX, DOPS |
| 1. **Penetrating Spine Injuries and Long Term Considerations of Spine Injuries** |  | | * Gunshot wounds to the spine * Penetrating trauma to the neck * Delayed cervical instability. * Delayed deterioration following spinal cord injuries * Chronic management issues with spinal cord injuries | LGIS, Bedside Teaching& skill teaching in OT | MCQs , SAQs,DOPS |

***Curriculum of 4thyear MS Neurosurgery***

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| **TOPICS TO BE TAUGHT** | **LEARNING OBJECTIVES**  **Student should be able to know:** | | **TEACHING METHODS** | **ASSESSMENT** |
| 1. **Primary tumors ---Classification and Tumor Markers** |  | * Classification of nervous system tumors * Brain tumors—general clinical aspects * Pediatric brain tumors * Medications for brain tumors * Chemotherapy for brain tumors * Intraoperative pathology consultations (“frozen section * Select commonly utilized stains in neuropathology | LGIS | MCQs & SAQs |
| 1. **Syndromes involving Tumors** |  | * Neurocutaneous disorders * Familial tumor syndromes | LGIS | MCQs & SAQs |
| 1. **Diffuse Astrocytic and Oligodentroglial tumors** |  | * Incidence * Risk factors for diffuse gliomas * Classification and grading of astrocytic tumors * General features of gliomas * Diffuse astrocytomas * Glioblastomas * Diffuse midline glioma, H3 K27M-mutant * (WHO grade IV) * Oligodendroglial * Oligoastrocytic * Multiple * Treatment of WHO grade II diffuse * Treatment of WHO grade III & IV diffuse gliomas * Response to treatment * Treatment for recurrent GBM * Outcome. | LGIS, Bedside Teaching, Skill teaching in OT | MCQs & SAQs  Mini CEX, DOPS |
| 1. **Ohers Astrocytic Tumors** |  | * Pilocytic astrocytomas (PCAs) (WHO grade I * Subependymal giant cell astrocytoma * (SEGA) (WHO grade I * Pleomorphic xanthoastrocytoma (PXA) (WHO grade II * Anaplastic pleomorphic xanthoastrocytoma (WHO * grade III) | LGIS, Bedside Teaching, Skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Ependymal , Choroid Plexus and Neuronal tumors and Other Gliomas** |  | * Ependymal tumors * Other * Choroid plexus tumors * Neuronal and mixed neuronal-glial tumors. | LGIS, Bedside Teaching, Skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Pineal region and Embryonal tumors** |  | * Pineal region tumors * Embryonal tumors | LGIS, Bedside Teaching, Skill teaching in OT | MCQs & SAQs  Mini CEX, DOPS |
| 1. **Tumors of the Cranial , spinal and Peripheral nerves** |  | * Vestibular * erineurioma (WHO grade I-III * Malignant peripheral nerve sheath tumors (MPNST) * (no WHO grade) | LGIS, Bedside Teaching, Skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Meningeal , mesenchymal and melanocytic tumors** |  | * Mesenchymal, non-meningothelial tumors * Melanocytic tumors | LGIS, Bedside Teaching, Skill teaching in OT | MCQs & SAQs  Mini CEX, DOPS |
| 1. **Lymphoid , histiocytic tumors , Germ cell tumors and tumors of the sellar origin** |  | * Lymphomas (CNS) * Histiocytic tumors * Germ cell tumors (GCT) * Tumors of the sellar region | LGIS, Bedside Teaching, Skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Pituitary tumors---General information and classification** |  | * Pituitary tumors – key concepts * General tumor types * Epidemiology * Differential diagnosis of pituitary tumors * Clinical presentation of pituitary tumors * Specific types of pituitary tumors | LGIS, Bedside Teaching, Skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Pituitary adenomas ----Evaluation and nonsurgical management** |  | * Evaluation * Management/treatment recommendations * Radiation therapy for pituitary adenomas | LGIS, Bedside Teaching | MCQs & SAQs  miniCEX, DOPS |
| 1. **Pituitary adenomas ---surgical management , outcome and Recurrence management** |  | * Surgical treatment for pituitary adenomas * Outcome following transsphenoidal surgery * Follow-up suggestions for pituitary adenomas. * Recurrent pituitary adenomas | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Esthesioneuroblastoma, Cyst and tumor like lesions** |  | * Esthesioneuroblastoma * Rathke’s cleft cyst * Colloid cyst * Epidermoid and dermoid tumors * Pineal cysts (PCs) | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Pseudotumor cerebri and Empty sella syndrome** |  | * Pseudotumor cerebri * Empty sella syndrome | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Tumors and tumor like lesions of the Skull** |  | * Skull tumors * Non-neoplastic skull lesions | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Tumors of spine and spinal cord** |  | * Spine tumors – general information * Compartmental locations of spinal tumors * Differential diagnosis: spine and spinal cord tumors * Intra-dural extramedullary spinal cord tumors * Intramedullary spinal cord tumors * Primary bone tumors of the spine | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Metastatic and hematopoietic tumors** |  | * Cerebral metastases * Spinal epidural metastases. * Hematopoietic tumors | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Neurology** |  | * Dementia * Headache * Parkinsonism * Multiple sclerosis * Acute disseminated encephalomyelitis * Motor neuron diseases * Guillain-Barré syndrome * Myelitis * Neurosarcoidosis. | SGD | MCQs & SAQs |
| 1. **Neurovascular disorders and Neurotoxicology** |  | * Posterior reversible encephalopathy syndrome (PRES) * Crossed cerebellar diaschisis * Vasculitis and vasculopathy * Neurotoxicology | SGD | MCQs & SAQs |
| 1. **Low back pain and Radiculopathy** |  | * Low back pain – general information * Intervertebral disc * Nomenclature for disc pathology * Vertebral body marrow changes * Clinical terms * Disability, pain and outcome determinations * Differential diagnosis of low back pain * Initial assessment of the patient with back pain * Radiographic evaluation * Electrodiagnostics for low back problems * Bone scan for low back problems * Thermography for low back problems * Psychosocial factors * Treatment. * Chronic low back pain * Coccydynia. * Failed back surgery syndrome | LGIS, Bedside Teaching | MCQs & SAQs  DOPS |
| 1. **Lumbar and thoracic Intervertabral Disc herniation / Radiculopathy** |  | * Lumbar disc herniation and lumbar radiculopathy * Thoracic disc herniation. | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Cervical Disc Herniation** |  | * Cervical disc herniation – general information * Cervical nerve root syndromes (cervical radiculopathy) * Cervical myelopathy and SCI due to cervical disc * herniation * Differential diagnosis * Physical exam for cervical disc herniation * Radiologic evaluation * Treatment | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Degenerative Cervical Disc Disease and cervical Myelopathy** |  | * Cervical disc degeneration – general information Pathophysiology * Clinical * Differential diagnosis * Evaluation * Treatment * Coincident cervical and lumbar spinal stenosis | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Thoracic and Lumbar Degenerative Disc disease** |  | * Degenerative disc disease – general information * Anatomic substrate * Risk factors * Associated conditions * Clinical presentation * Differential diagnosis * Diagnostic evaluation * Treatment | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Adult spinal Deformity and degenerative scoliosis** |  | * Adult spinal deformity - general information * Epidemiology * Clinical evaluation * Diagnostic testing * Pertinent spine measurements * SRS-Schwab classification of adult spinal deformity * Treatment/management | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Special Conditions Affecting the Spine** |  | * Paget’s disease of the spine * Anklyosing and ossifying conditions of the spine * Scheuermann’s kyphosis * Miscellaneous conditions affecting the spine | LGIS, Bedside Teaching | MCQs & SAQs  DOPS |
| 1. **Other non-spine conditions with spine implications** |  | * Rheumatoid arthritis * Down syndrome * Morbid obesity | LGIS, Bedside Teaching | MCQs & SAQs  DOPS |
| 1. **Special Conditions Affecting the Spinal Cord** |  | * Spinal vascular malformations * Spinal meningeal cysts * Juxtafacet cysts of the lumbar spine * Syringomyelia * Posttraumatic syringomyelia * Spinal cord herniation (idiopathic) * Spinal epidural lipomatosis (SEL) * Craniocervical junction and upper cervical spine * Abnormalities | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |

***Curriculum of 5thyear MS Neurosurgery***

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| **TOPICS TO BE TAUGHT** | **LEARNING OBJECTIVES**  **Student should be able to know:** | | **TEACHING METHODS** | **ASSESSMENT** |
| 1. **Aneurysm—Introduction , Grading, Special Conditions** |  | * Aneurysms – Introduction, Grading, Special * Conditions. * Introduction and overview * Etiologies of SAH * Incidence * Risk factors for SAH * Clinical features * Work-up of suspected SAH * Grading SAH * Pregnancy and intracranial hemorrhage * Hydrocephalus after SAH | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Critical care for Aneurysm Patients** |  | * Critical Care of Aneurysm Patients * Initial management of SAH * Re-bleeding * Neurogenic stress cardiomyopathy (NSC) * Neurogenic pulmonary edema * Vasospasm * Post-op orders for aneurysm clipping. | LGIS, Bedside Teaching | MCQs & SAQs  DOPS |
| 1. **SAH and CereberalAneyrysm Rupture** |  | * SAH from Cerebral Aneurysm Rupture * Epidemiology of cerebral aneurysms * Etiology of cerebral aneurysms * Location of cerebral aneurysms. * Presentation of cerebral aneurysms. * Conditions associated with aneurysms * Treatment options for aneurysms * Timing of aneurysm surgery * General technical considerations of aneurysm surgery | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  ,DOPS |
| 1. **Aneurysm type by Location** |  | * Aneurysm Type by Location * Anterior communicating artery aneurysms * Distal anterior cerebral artery aneurysms * Posterior communicating artery aneurysms * Carotid terminus (bifurcation) aneurysms * Middle cerebral artery (MCA) aneurysms * Supraclinoid aneurysms * Posterior circulation aneurysms | LGIS, Bedside Teaching | MCQs & SAQs |
| 1. **Special Aneurysms and Non-aneurysmal SAH** |  | * Special Aneurysms and Non-Aneurysmal SAH * Unruptured aneurysms * Multiple aneurysms * Familial aneurysms * Traumatic aneurysms * Mycotic aneurysms * Giant aneurysms * Cortical subarachnoid hemorrhage * SAH of unknown etiology * Pretruncalnonaneurysmal SAH (PNSAH) | LGIS, Bedside Teaching | MCQs & SAQs |
| 1. **Vascular Malformations** |  | * Vascular malformations – general information and * classification * Arteriovenous malformation (AVM) * Developmental venous anomalies (DVA) (venous * angiomas) * Angiographically occult vascular malformations. * Osler-Weber-Rendu syndrome * Cavernous malformation * Dural arteriovenous fistulae (DAVF) * Vein of Galen malformation * Carotid-cavernous fistula * Sigmoid sinus diverticulum | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  miniCEX, DOPS |
| 1. **Stroke---- general information and Physiology** |  | * Definitions * Cerebrovascular hemodynamics * Collateral circulation * “Occlusion” syndromes Stroke in young adults * Atherosclerotic carotid artery disease | LGIS, Bedside Teaching | MCQs & SAQs |
| 1. **Evaluation and treatment for acute ischemic stroke** |  | * Stroke management – general information * (time = brain) * Rapid initial evaluation/management * NIH stroke scale (NIHSS) * General management for acute ischemic stroke (AIS) * Imaging in acute ischemic stroke (AIS) * Management of TIA or stroke * Carotid endarterectomy * Carotid angioplasty/stenting | LGIS, Bedside Teaching | MCQs & SAQs |
| 1. **Special conditions** |  | * Totally occluded internal carotid artery * Cerebellar infarction * Malignant middle cerebral artery territory infarction * Cardiogenic brain embolism * Vertebrobasilar insufficiency * Bow hunter’s stroke * Cerebral venous thrombosis * Moyamoya disease * Extracranial-intracranial (EC/IC) bypass. | LGIS, Bedside Teaching | MCQs & SAQs |
| 1. **Cerebral Arterial Dissections** |  | * Cerebral Arterial Dissections * Cerebral arterial dissections – key concepts * Nomenclature * Pathophysiology * Epidemiology * Sites of dissection * Clinical * Evaluation * Overall outcome * Vessel specific information. | LGIS | MCQs & SAQs |
| 1. **Intracerebral haemorrhage** |  | * Intracerebral Hemorrhage * Intracerebral hemorrhage – general information * Epidemiology * Locations of hemorrhage within the brain * Etiologies * Clinical * Evaluation * Initial management of ICH * Surgical treatment * Outcome * ICH in young adults. * Intracerebral hemorrhage in the newborn * Other causes of intracerebral hemorrhage * in the newborn | LGIS, Bedside Teaching& skill teaching in OT | MCQs & SAQs  DOPS |
| 1. **Outcome assessment** |  | * Outcome Assessment * Cancer * Head injury * Cerebrovascular events * Spinal cord injury | LGIS | MCQs & SAQs |
| 1. **Intraoperative Dyes , OR Equipment , Surgical hemostasis and bone Extenders** |  | * Intraoperative Dyes, OR Equipment, Surgical * Hemostasis & Bone Extenders * Introduction * Intraoperative dyes * Operating room equipment * Surgical hemostasis * Localizing levels in spine surgery * Bone graft | LGIS | MCQs & SAQs |
| 1. **Craniotomies –General information and Cortical Mapping** |  | * Craniotomies – General Information & Cortical * Mapping * Craniotomy – general information * Intraoperative cortical mapping (brain mapping | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs  DOPS |
| 1. **Posterior Fossa Craniotomies** |  | * Posterior Fossa Craniotomies * Indications * Position * Paramedian suboccipital craniectomy * Midline suboccipital craniectomy * Extreme lateral posterior fossa approach * Cranioplasty for suboccipital craniectomy * Post-op considerations for p-fossa craniotomies | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs  DOPS |
| 1. **Supra-tentorial Craniotomies** |  | * Supratentorial Craniotomies * Pterional craniotomy * Temporal craniotomy * Frontal craniotomy * Petrosal craniotomy * Occipital craniotomy. | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs  DOPS |
| 1. **Approaches to Lateral and third ventricles** |  | * Approaches to the Lateral and Third Ventricles, * Decompressive Craniectomies &Cranioplasy * Approaches to the lateral ventricle * Approaches to the third ventricle * Interhemispheric approach * Cranioplasty * Decompressive craniectomy | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs  DOPS |
| 1. **Spine , Cervical** |  | * Spine, Cervical * Anterior approaches to the cervical spine * Transoral approach to anterior craniocervical junction * Occipitocervical fusion * Anterior odontoid screw fixation * Atlantoaxial fusion (C1–2 arthrodesis) * C2 screws * Anterior cervical vertebral body screw-plate fixation * Zero profile interbody devices | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs, miniCEX  DOPS |
| 1. **Spine, Thoracic and Lumbar** |  | * Spine, Thoracic and Lumbar * Anterior access to the cervicothoracic junction/upper * thoracic spine * Anterior access to mid and lower thoracic spine * Thoracic pedicle screws * Anterior access to thoracolumbar junction * Anterior access to the lumbar spine * Instrumentation/fusion pearls for the lumbar and * lumbosacral spine * Lumbosacral pedicle screws * Lumbar cortical bone trajectory screw fixation * Translaminar lumbar screw fixation * Posterior lumbar interbody fusion (PLIF and TLIF) * Minimally invasive lateral retroperitoneal transpsoas * interbody fusion * Transfacet pedicle screws * Facet fusion * S2 screws * Iliac fixation * Post-op clinic visits—lumbar and/or thoracic spine fusion. . | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs, miniCEX  DOPS |
| 1. **Miscellaneous Surgical Procedures** |  | * Miscellaneous Surgical Procedures * Percutaneous ventricular puncture * Percutaneous subdural tap * Lumbar puncture * Lumbar catheter CSF drainage * C1–2 puncture and cisternal tap * Ventricular catheterization * CSF diversionary procedures * Ventricular access device * Sural nerve biopsy * Nerve blocks * Multistranded cable for spine fusion | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs,  DOPS |
| 1. **Functional Neurosurgery and Stereotactic Neurosurgery** |  | * Functional Neurosurgery & Stereotactic * Neurosurgery * Introduction * Stereotactic surgery * Deep brain stimulation * Torticollis * Spasticity * Neurovascular compression syndromes * Sympathectomy . | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs  DOPS |
| 1. **Pain Procedures** |  | * Pain Procedures * Prerequisites for pain procedures * Choice of pain procedure * Types of pain procedures. * Cordotomy * Commissural myelotomy * Punctate midline myelotomy * CNS narcotic administration * Spinal cord stimulation (SCS) * Deep brain stimulation (DBS) * Dorsal root entry zone (DREZ) lesions. | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs  DOPS |
| 1. **Seizure surgery** |  | * Seizure Surgery * Indications for seizure surgery * Pre-surgical evaluation * Surgical techniques * Surgical procedures * Risks of seizure surgery * MRI guided laser interstitial thermal therapy (MRGLITT) * Postoperative management for seizure surgery (epilepsy * surgery) * Outcome | LGIS, Bedside Teaching & skill teaching in OT | MCQs & SAQs  DOPS |
| 1. **Radiation therapy (XRT)** |  | * Radiation Therapy (XRT) * Introduction * Conventional external beam radiation * Stereotactic radiosurgery and radiotherapy * Interstitial brachytherapy | SGD | MCQs & SAQs |
| 1. **Endovascular neurosurgery** |  | * Endovascular Neurosurgery * Pharmacologic agents * Neuroendovascular procedure basics * Diagnostic angiography for cerebral subarachnoidhemorrhage * Disease-specific intervention | SGD | MCQs & SAQs |

# SECTION – VI CURRICULUM OF RESEARCH AND WORKSHOPS

***CURRICULUM OF RESEARCH***

**INTRODUCTION**

With advent of Evidence Based Practice over last two to three decades in medical science, merging the best research evidence with good clinical expertise and patient values is inevitable in decision making process for patient care. Therefore apart from receiving per excellence knowledge of the essential principles of medicine and necessary skills of clinical procedures, the trainees should also be well versed and skillful in research methodologies. So the training in research being imperative is integrated longitudinally in all four year’s training tenure of the trainees.

The purpose of the research training is to provide optimal knowledge and skills regarding research methods and critical appraisal. The expected outcome of this training is to make trainees dexterous and proficient to practically conduct quality research through amalgamation of their knowledge, skills and practice in research methodologies.

**ORIENTATION SESSION FOR POST GRADUATE TRAINEES**:

1. At the beginning of the research course, an orientation session or an introductory session of one hour duration will be held, organized by Director, Deputy Directors of ORIC (Office of Research Commercialization and Innovation) of RMU to make trainees acquainted to the research courses during four years post graduate training, the schedule of all scholarly and academic activities related to research and the assessment procedures.
2. Trainees will also be introduced to all the facilitators of the course, organizational structure of ORIC (Annexure 1) and the terms of references of corresponding authorities (Annexure 2) for any further information and facilitation.
3. All the curriculum details and materials for assistance and guidance will be provided to trainees during the orientation session.
4. The research model of RMU as given in Figure 1 and will be introduced to the newly inducted trainees of RMU.

VICE CHANCELLOR

BOARD OF ADVANCED STUDIES

AND RESEARCH

OFFICE OF RESEARCH, INNOVATION &

COMMERCIALIZATION

**Research Operations & Development**

**Wing**

***RESEARCH***

***CENTRES OF***

***VARIOUS***

***SPECIALITIES OF***

***ALLIED***

***HOSPITALS***

***RAWALIAN***

***STUDENTS***

***RESEARCH***

***SOCIETY***

***DATA***

***ANALYSIS***

***CENTRE***

***RESEARCH***

***PUBLICATION***

***UNIT***

**RESEARCH**

**UNIT**

**Research Innovation Entrepreneurship**

**Wing**

***VISITOR***

***RESEARCHER'S***

***CENTRE***

INSTITUTIONAL

RESEARCH ETHICS

FORUM

**Figure 1.MODEL OF RESEARCH AT RAWALPINDI NEUROSURGICAL UNIVERSITY**

The research training component for Post Graduate Trainees comprises of 05 years and the Distribution and curriculum for each year is mentioned as follows:

***RESEARCH & THESIS WRITING***

* Research and Thesis have to be completed during training period.
* Research topic selection is must in first 06 months of 3rd year. Synopsis writing and approval from IRF & BASR are must in second half of 3rd year.
* In 4th year of training Thesis should be written and completed, while in 5th year after appropriate defense Thesis should be approved by BASR.

**Research Experience & Workshops:**

The active research component program must ensure meaningful, supervised research experience with appropriate protected time for each resident while maintaining the essential clinical and surgical experience. Residents must learn the design and interpretation of research studies, responsible use of informed consent, and research methodology and interpretation of data.

The program must provide instruction in the critical assessment of new therapies and of the medical literature. Residents will be advised and supervised by qualified staff members in the conduct of research.

To help conduct Research and to facilitate Thesis writing following workshops are during training that will be organized by RMU:

• Communication skills

* Computer & IT skills
* Synopsis writing, Research Methodology & Biostatistics
* Primary Surgical Skills

**Clinical Research**

Each resident will participate in at least one clinical research study to become familiar with

1. Research design
2. Research involving human subjects including informed consent and operations of the Institutional Review Board and ethics of human experimentation
3. Data collection and data analysis
4. Research ethics and honesty
5. Peer review process

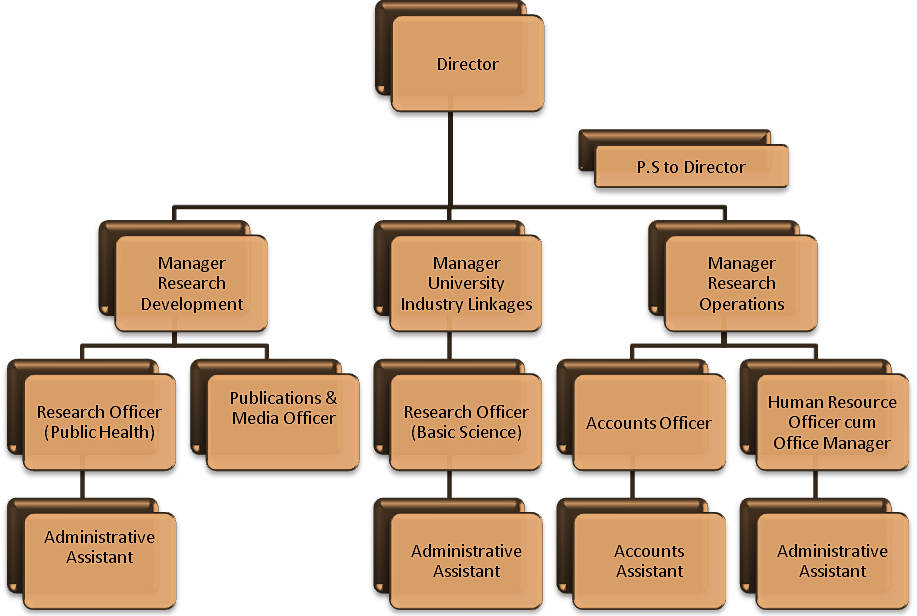
This usually is done during the consultation and outpatient clinic rotations.

**Thesis**

The candidates shall prepare their synopsis as per guidelines provided by Institutional Research Forum/Ethical Review Board (IRF/ERB) and Board of Advanced Studies & Research (BASR). The research topic must consist of a reasonable sample size and sufficient numbers of variables to give training to the candidate to conduct research, collect and analyze data. Synopsis of research project should be approved in 3rd year of MS Neurosurgery program by IRF/ERB and BASR. In 4th year Thesis work should be completed, and in 5th year it should be approved from BASR.

**ANNEXURE 1**

**THE ORGANIZAITONAL CHART OF ORIC OF RMU**



*Note: Managers of ORIC are also referred to as Deputy Directors in RMU*

***WORKSHOPS***

WORKSHOPS (3 hours each for 2-5 days)

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **NAME OF WORKSHOP** | **LEARNING OBJECTIVES** | **TOPICS TO BE COVERED** |
| **1.** | **Biostatistics & Research**  **Methodology**  **(4 days)** | * To understand the basics of Bio-Statistics * To critique why research is important? * To discuss the importance of Selecting a Field for Research * To prepare oneself for Participation in National and International Research * To prepare oneself for Participation in Pharmaceutical Company Research * To interpret the importance of research ideas & Criteria for a good research topic * To discuss Ethics in Health Research * To learn to write a Scientific Paper * To learn to make a Scientific Presentation * To learn to make a purposeful literature search | Introduction to Bio-Statistics  Introduction to Bio- Neurosurgical Research Why research is important?  What research to do?   * + - * Selecting a Field for Research       * Drivers for Health Research       * Participation in National and   International Research   * + - * Participation in Pharmaceutical Company Research       * Where do research ideas come from       * Criteria for a good research topic Ethics in Health Research   Writing a Scientific Paper  Making a Scientific Presentation & Searching the Literature |
| **2.** | **Introduction to computer/information Technology & Software (5 days** | By the end of this workshop student should be able to   * Appropriately start up and shut down your computer. * Navigate the operating system and start applications. * Perform basic functions of file management. * Perform basic functions in a word processor and spreadsheet. Manage print settings and print documents. * Receive and send email. * Use a web browser to navigate the Internet. * work with windows, toolbars, and command menus * perform basic word processing and graphic tasks make a Power Point Point presentation explore Web browsing basics * back up files save, copy, and organize your work to enter data accurately in software of Statistical Package for Social Sciences | 1.Hardware and Software   * Understand the main components of a computer including input and output devices. * Understand the function of communication devices such as smartphones and tablets. * Understand the role of Operating Systems, programs and apps.   2.Windows   * Turning on the computer and logging on. * The Windows screen. * Running programs from the Start Menu. * Minimizing, maximizing, moving, resizing and closing windows. * Logging off and shutting down your computer.   3.Working with Programs   * Running multiple programs. * Desktop icons and creating a desktop shortcut. * Managing programs from the taskbar. * Closing programs.   4.File Management   * Managing Windows Explorer. * Creating, moving, renaming and deleting folders and files. * Understandings file extensions. * Viewing storage devices and network connections. * Managing USB flash drives.   5.Word Processing   * Creating documents in Microsoft Word. * Typing text, numbers and dates into a document. * Easy formatting. * Checking the spelling in your document. * Making and saving changes to your document.     6.Power Point   * Making Power Point presentation   7.Spreadsheets   * Understanding spreadsheet functionality. * Creating spreadsheets in Microsoft Excel. * Typing text numbers and dates into a worksheet. * Easy formulas. * Easy formatting. * Charting your data. * Making and saving changes to your workbook. * Printing a worksheet.   8.Printing   * Print preview. * Print settings. * Managing the print queue.   9.Using Email   * The Outlook mail screen elements. * Composing and sending an email message. * Managing the Inbox.   10.Accessing the Internet   * Going to a specific website and bookmarking. * Understanding how to search/Google effectively. * Copy and paste Internet content into your documents and emails. * Stopping and refreshing pages. * Demystifying the Cloud. * Understanding social media platforms such as Facebook and Twitter. * Computer security best practices.   11.Statistical Package for Social Sciences   * general understanding for data entry |
| **3.** | **communication skills**  **(3 days)** | * To learn to use Non-medicinal * Interventions in Communication * Skills of Clinical Practice * To discuss the importance of counseling * To role play as a counselor * To learn to manage a conflict resolution * To learn to break a bad news * To discuss the importance of Neurosurgical Ethics, Professionalism and * Doctor-Patient Relationship * Hippocratic Oath * To learn to take an informed consent * To illustrate the importance of confidentiality * To summarize Ethical Dilemmas in a Doctor’s Life | * Use of Non-medicinal Interventions in Clinical Practice Communication Skills * Counseling * Informational Skills * Crisis Intervention/Disaster * Management Conflict Resolution * Breaking Bad News * Neurosurgical Ethics, Professionalism and Doctor-Patient Relationship Hippocratic Oath * Four Pillars of Neurosurgical Ethics (Autonomy, Beneficence, Non-malficence and Justice) * Informed Consent and Confidentiality * Ethical Dilemmas in a Doctor’s Life |
| **4.** | **PRIMARY SURGICAL SKILLS( 3 DAYS)** | * Introduction to fundamentals of surgical skills * Explain principles of universal precautions * Demonstrate procedures for handwashing, gowning and gloving * Demonstrate operation theatre protocols such as maintainance of sterile field and handling of surgical instruments * Demonstrate technique of secure surgical knots * Demonstrate basic surgical suturing with instruments | * Urethral catheterization * Handling of diathermy * Handling of surgical instruments * Suture materials * Drain insertion * Surgical knot tying * Suturing of wounds * Hand washing * Scrubing,gowning and gloving * Basic wound management |

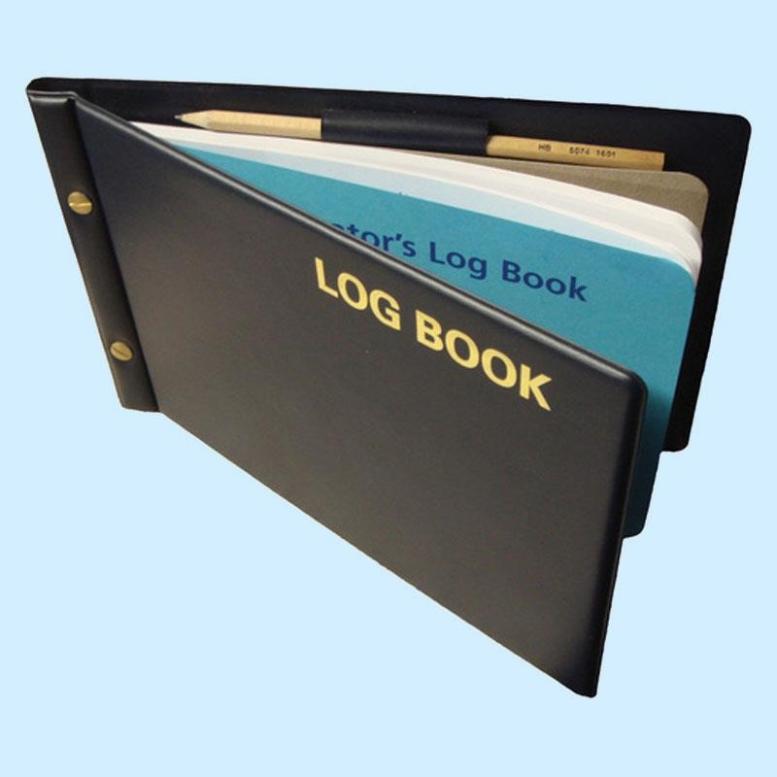
# **SECTION – VII LOG BOOK AND PORTFOLIO**

***LOGBOOK OF MS NEUROSURGERY***



MS NEUROSURGERY

RAWALPINDI MEDICAL UNIVERSITY RAWALPINDI



### **ENROLMENT DETAILS**

Program of Admission \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Session \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Registration / Training Number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name of Candidate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Father’s Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date of Birth \_\_\_\_\_\_\_ / \_\_\_\_\_\_\_ / \_\_\_\_\_\_\_\_\_\_\_\_ CNIC No. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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E-mail Address \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Date of Completion of Training \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name of Supervisor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Designation of Supervisor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Qualification of Supervisor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Title of department / Unit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name of Training Institute / Hospital \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**INTRODUCTION OF LOGBOOK:**

A structured book in which certain types of educational activities and patient related information is recorded, usually by hand. Logbooks are used all over the world from undergraduate to postgraduate training, in human, veterinary and dental medicine, nursing schools and pharmacy, either in paper or electronic format .

Logbooks provide a clear setting of learning objectives and give trainees and clinical teachers a quick overview of the requirements of training and an idea of the learning progress. Logbooks are especially useful if different sites are involved in the training to set a (minimum) standard of training. Logbooks assist supervisors and trainees to see at one glance which learning objectives have not yet been accomplished and to set a learning plan.The analysis of logbooks can reveal weak points of training and can evaluate whether trainees have fulfilled the minimum requirements of training.

Logbooks facilitate communication between the trainee and clinical teacher. Logbooks help to structure and standardize learning in clinical settings. In contrast to portfolios, which focus on students’ documentation and selfreflection of their learning activities, logbooks set clear learning objectives and help to structure the learning process in clinical settings and to ease communication between trainee and clinical teacher. To implement logbooks in clinical training successfully, logbooks have to be an integrated part of the curriculum and the daily routine on the ward. Continuous measures of quality management are necessary.

**Reference**

[*Brauns*https://www.ncbi.nlm.nih.gov/pubmed/?term=Sch&%23x000fc;ttpelz-Brauns K[Author]&cauthor=true&cauthor\_uid=26841068](https://www.ncbi.nlm.nih.gov/pubmed/?term=Sch%26%23x000fc%3Bttpelz-Brauns%20K%5BAuthor%5D&cauthor=true&cauthor_uid=26841068)*KS,*[*Narciss*https://www.ncbi.nlm.nih.gov/pubmed/?term=Narciss E[Author]&cauthor=true&cauthor\_uid=26841068](https://www.ncbi.nlm.nih.gov/pubmed/?term=Narciss%20E%5BAuthor%5D&cauthor=true&cauthor_uid=26841068)*E,*[https://www.ncbi.nlm.nih.gov/pubmed/?term=Schneyinck C[Author]&cauthor=true&cauthor\_uid=26841068*Schneyinck*https://www.ncbi.nlm.nih.gov/pubmed/?term=Schneyinck C[Author]&cauthor=true&cauthor\_uid=26841068](https://www.ncbi.nlm.nih.gov/pubmed/?term=Schneyinck%20C%5BAuthor%5D&cauthor=true&cauthor_uid=26841068)*C,*[https://www.ncbi.nlm.nih.gov/pubmed/?term=B&%23x000f6;hme K[Author]&cauthor=true&cauthor\_uid=26841068https://www.ncbi.nlm.nih.gov/pubmed/?term=B&%23x000f6;hme K[Author]&cauthor=true&cauthor\_uid=26841068*Böhme*https://www.ncbi.nlm.nih.gov/pubmed/?term=B&%23x000f6;hme K[Author]&cauthor=true&cauthor\_uid=26841068](https://www.ncbi.nlm.nih.gov/pubmed/?term=B%26%23x000f6%3Bhme%20K%5BAuthor%5D&cauthor=true&cauthor_uid=26841068)*K,*[https://www.ncbi.nlm.nih.gov/pubmed/?term=Br&%23x000fc;stle P[Author]&cauthor=true&cauthor\_uid=26841068https://www.ncbi.nlm.nih.gov/pubmed/?term=Br&%23x000fc;stle P[Author]&cauthor=true&cauthor\_uid=26841068*Brüstle*https://www.ncbi.nlm.nih.gov/pubmed/?term=Br&%23x000fc;stle P[Author]&cauthor=true&cauthor\_uid=26841068](https://www.ncbi.nlm.nih.gov/pubmed/?term=Br%26%23x000fc%3Bstle%20P%5BAuthor%5D&cauthor=true&cauthor_uid=26841068)*P,*[https://www.ncbi.nlm.nih.gov/pubmed/?term=Mau-Holzmann U[Author]&cauthor=true&cauthor\_uid=26841068*Holzmann*https://www.ncbi.nlm.nih.gov/pubmed/?term=Mau-Holzmann U[Author]&cauthor=true&cauthor\_uid=26841068](https://www.ncbi.nlm.nih.gov/pubmed/?term=Mau-Holzmann%20U%5BAuthor%5D&cauthor=true&cauthor_uid=26841068)*UM,etal. Twelve tips for successfully implementing logbooks in clinical training. Med Teach. 2016 Jun 2; 38(6): 564–569.*

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SECTION-I

MORNING REPORT PRESENTATION/ CASE PRESENTATION (LONG AND SHORT CASES)

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| **SR#** | **DATE** | **REG# OF**  **PATIENT** | **DIAGNOSIS & BRIEF DESCRIPTION** | **SIGNATURES OF THE SUPERVISOR** |
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Section-2

**TOPIC PRESENTATION/SEMINAR**

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| **SR#** | **DATE** | **NAME OF THE TOPIC & BRIEF DETAILS OF THE ASPECTS COVERED** | **SIGNATURES OF THE SUPERVISOR** |
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#### **Section-3**

##### **JOURNAL CLUB**

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| **SR#** | **DATE** | **TITLE OF THE ARTICLE** | **NAME OF JOURNAL** | **DATE OF PUBLICATION** | **SIGNATURES OF THE SUPERVISOR** |
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#### **Section-4**

##### **case discussion**

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| **SR #** | **DATE** | **REG.# OF THE PATIENT DISCUSSED** | **DIAGNOSIS** | **BRIEF DESCRIPTION OF THE CASE** | **SIGNATURES OF THE SUPERVISOR** |
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#### **Section-5**

##### **Record of total emergency cases seen on emergency call days**

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| **SR.#** | **DATE** | **TOTAL NUMBER OF CASES ATTENDED** | **SIGNATURES OF THE SUPERVISOR** |
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#### **Section-6**

##### **Record of total indoor cases seen on call days in the ward**

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| **SR.#** | **DATE** | **TOTAL NUMBER OF CASES ATTENDED** | **SIGNATURES OF THE SUPERVISOR** |
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#### **Section-7**

##### **Record of total opd/clinic cases seen on opd call days**

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| **SR.#** | **DATE** | **TOTAL NUMBER OF CASES ATTENDED** | **SIGNATURES OF THE SUPERVISOR** |
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#### **Section-8**

##### **EMERGENCY Procedures**

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| **SR.#** | **DATE** | **REG NO. OF PATIENT** | **NAME OF PROCEDURE** | **OBSERVED/ASSISTED/PERFORMED**  **UNDER**  **SUPERVISION/PERFORMED**  **INDEPENDENTLY** | **PLACE OF PROCEDURE** | **SIGNATURES OF THE SUPERVISOR** |
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#### **Section-9**

##### **ELECTIVE Procedures**

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| **SR.#** | **DATE** | **REG NO. OF PATIENT** | **NAME OF PROCEDURE** | **OBSERVED/ASSISTED/PERFORMED**  **UNDER**  **SUPERVISION/PERFORMED**  **INDEPENDENTLY** | **PLACE OF PROCEDURE** | **SIGNATURES OF THE SUPERVISOR** |
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#### **SECTIOn-10**

##### **MULTI DICIPLINARY MEETINGS**

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| **SR#** | **DATE** | **BRIEF DESCRIPTION** | **SIGNATURES OF THE SUPERVISOR** |
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**SECTION-11**

##### **clinicopathological conference (cpc)**

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| **SR#** | **DATE** | **BRIEF DESCRIPTION OF THE TOPIC/CASE DISCUSSED** | **SIGNATURES OF THE SUPERVISOR** |
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#### **SECTION-12**

##### **Morbidity/mortality meetings**

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| **SR#** | **DATE** | **REG. # OF THE**  **PATIENT DISCUSSED** | **BRIEF DESCRIPTION** | **COMMENTS/SUGGESTIONS** | **SIGNATURES OF THE SUPERVISOR** |
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#### **SECTION-13**

##### **HANDS ON TRAINING/workshops**

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| **SR#** | **DATE** | **TITLE** | **VENUE** | **FACILITATOR** | **SIGNATURES OF THE SUPERVISOR** |
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#### **SECTION-14**

##### **Publications**

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| **SNO.** | **NAME OF**  **PUBLICATION** | **TYPE OF PUBLICATION**  **ORIGINAL**  **ARTICLE/EDITORIAL/CASE**  **REPORT ETC** | **NAME OF JOURANL** | **DATE OF**  **PUBLICATION** | **PAGE NO.** | **SIGNATURES**  **OF THE**  **SUPERVISOR** |
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#### **SECTION-15**

##### **Clinical ASSESSMENT RECORD**

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| **SR.#** | **TOPIC OF CLINICAL TEST/ EXAMINATION** | **TYPE OF THE TEST&**  **VENUE**  **OSPE, MINICEX, CHART**  **STIMULATED RECALL, DOPS,**  **SIMULATED PATIENT, SKILL LAB**  **e.t.c** | **TOTAL MARKS** | **MARKS**  **OBTAINED** | **SIGNATURES OF THE SUPERVISOR** |
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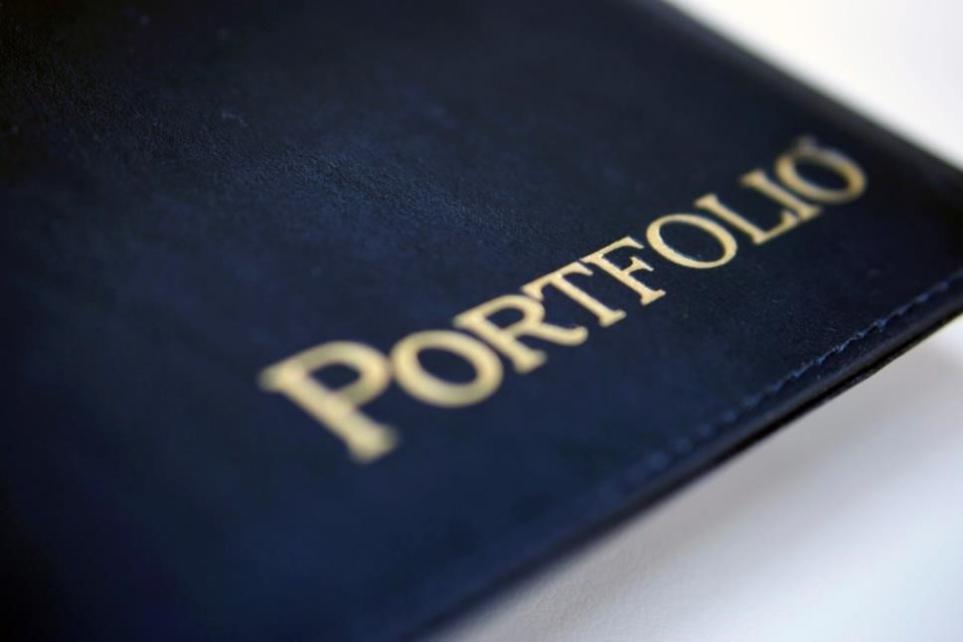
***PORTFOLIO (TEMPLATES)***



MS NEUROSURGERY

RAWALPINDI MEDICAL UNIVERSITY

RAWALPINDI



**ENROLMENT DETAILS**

Program of Admission \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Name of Candidate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Qualification of Supervisor \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Title of department / Unit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name of Training Institute / Hospital \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Introduction of portfolio**

**What is a portfolio?**

A collection of a learner’s various documents and assessments throughout residency that reflect their professional development over time. May include referral letters and procedure logs (Rider et al., 2007).Portfolios also frequently include self-assessments, learning plans, and reflective essays (Epstein, 2007).

**What should be included in a portfolio?**

Resident may include the following components in his or her portfolio:

* Curriculum Vitae (CV)
* Personal Publications
* Research abstracts presented at professional conferences
* Presentations at teaching units/departmental meetings and teaching sessions
* Patient (case) presentations
* Log of clinical procedures
* Copies of written feedback received (direct observations, field notes, daily evaluations)
* Quality improvement project plan and report of results
* Summaries of ethical dilemmas (and how they were handled)
* Chart notes of particular interest
* Photographs and logs of neurosurgical procedures performed
* Consult/referral letters of particular interest
* Monthly faculty evaluations
* 360-degree evaluations
* Copies of written instructions for patients and families
* Case presentations, lectures, logs of neurosurgical students mentored • Learning plans
* Writing assignments, or case-based exercises assigned by program director
* List of hospital/university committees served on
* Documentation of managerial skills (e.g., schedules or minutes completed by resident)
* Copies of billing sheets with explanations
* Copies of written exams taken with answer sheets
* In-training Evaluation Report (ITER) results
* Format can be as simple as material collected in a three-ringed binder or as sophisticated as information stored in a handheld Pocket PC (PPC).
* Patient confidentiality should be assured when any clinical material is included in the portfolio.
* Should be resident-driven and include a space for residents to reflect on their learning experiences.

**Why portfolio is required?**

Can be used as a:

* Formative learning tool: To help develop self-assessment and reflection skills.
* Summative evaluation tool: To determine if a competency has been achieved.
* Useful for evaluating competencies that are difficult to evaluate in more traditional ways such as:

Practice-based improvement

Use of scientific evidence in patient care Professional behaviors (Rider et al., 2007)

* Purpose is to highlight for the resident the need for ongoing learning and reflection to achieve and maintain competencies.
* Enormous flexibility in using the portfolio as a learning tool: Portfolio may focus on one area (e.g., assessments pertaining to professionalism in a learner with attitudinal issues) without losing its effectiveness for the broader scope of competencies.
* Number and frequency of entries may vary. Expectations, including minimum standards, should be defined with the resident from the outset.
* Portfolios can be powerful tools for guided self-assessment and reflection (Holmboe&Carracio, 2008)

**Evidence:**

* Evidence suggests that an assessment of skills is most valid when the tool used places the learner in an environment and/or situation that closely mimics that in which the learner will later practice the mastered skill (Wiggins et al., 1998). In that way, portfolios have the advantage of reflecting not just what residents can do in a controlled examination situation but what they actually do at work with real patients (Jackson et al., 2007).
* As an evaluation tool, the reliability and validity of a portfolio are dependent on the psychometric characteristics of the assessment and judging methods used in the portfolio process (Holmboe&Carracio, 2008).
* Research is still needed to determine whether portfolios can be a catalyst for self-directed, lifelong learning (O’Sullivan et al., 2002).

**Practicality/Feasibility:**

Portfolios can be time consuming for the resident to assemble and for the preceptor to assess.

***References:***

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2. Challis M. (1999). AMEE neurosurgical education guide no. 11 (revised): Portfolio-based learning and assessment in neurosurgical education. *Neurosurgical Teacher*, 21, 370-86.
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2. **CASE PRESENTATION**
3. **TOPIC PRESENTATION**
4. **JOURNAL CLUB**
5. **EMERGENCY**
6. **INDOOR**
7. **OPD AND CLINICS**
8. **PROCEDURAL SKILLS/DIRECTLY OBSERVED PROCEDURES**
9. **MULTIDISCIPLINARY MEETINGS**
10. **MORBIDITY/MORTALITY MEETINGS**
11. **HANDS ON TRAINING**
12. **RESEARCH PUBLICATIONS/MAJOR RESEARCH PROJECT/ ABSTRACT/SYNOPSIS/DISSERTATION/PAPER PRESENTATION**
13. **ASSESSMENT RECORDS & EVALUATION PROFORMAS**
14. **AWARDS/TESTIMONIALS/APPRECIATION LETTERS**
15. **ANY OTHER SPECIFIC ACHIEVEMENTS**
16. **FUTURE AIMS & OBJECTIVES**

### **CURRICULUM VITAE (CV)**

**Brief curriculum vitae encompassing all academic achievements & work experiences should be written or pasted here**

CASE PRESENTATION

**Interesting and unique case presentations should be written in this section with your own opinion and comments of the supervisor**

### **TOPIC PRESENTATION**

**Details of the topic presentations with the comments of the supervisor should be written here**

SECTION-4

### **JOURNAL CLUB**

**Details of the selected critical appraisals of research articles discussed in journal club meetings should be written here**

SECTIon-5

### **emergency**

### **Details of complicated and interesting emergency cases along with comments of the supervisor should written in this section**

SECTION-6

INDOOR

**Memorable cases seen in and managed in the neurosurgical ward along with comments of the supervisor should be mentioned in this section**

### **SECTIOn-7**

### **OPD AND CLINICS**

**Outpatient experiences along with supervisor’s comments should be written here**

SECTION-8

Procedural skills/Directly observed procedures

**Experiences during learning of procedures and details of directly observed procedures should be written here along with comments of the supervisor**

### **SECTION-9**

### **MULTI DICIPLINARY MEETINGS**

**Details of Multidisciplinary meetings attended should be written here with comments of the supervisor**

#### SECTION-10

Morbidity/mortality meetings

**Details morbidity/mortality meetings attended should be written here with comments of the supervisor**

SECTION -11

### **HANDS ON TRAINING**

Brief description of learning outcomes achieved by workshops attended should be written here along with the reason of need to have a specific workshop and also get endorsed the comments of the supervisor for each workshop separatel

SECTION-12

Research Publications/Major Research project/ abstract/synopsis/dissertation/paper presentation in a conference

**All research experiences should be mentioned in this section along with comments of the supervisor**

#### SECTION-13

##### ASSESSMENT Records/evaluation proformas

**Evidence of all available result cards and end of block (four months) evaluation record should mentioned in this section to have a reflection about resident’s Neurosurgical knowledge, patient care, Interpersonal and Communication Skills, system based learning, practice based learning and professionalism.**

SECTION-14

Awards/testimonials/ appreciation letters

**Evidence of awards, testimonials and appreciation letters if any should be given in this section with comments of the supervisor**

#### SECTION-15

ANY OTHER SPECIFIC ACHIEVEMENT

**Evidence of any other specific achievement done under forceful circumstances aas a passion should be mentioned in this section along with comments of supervisors a compulsion or done by chance without any previous plan or done**

#### SECTION-16

FUTURE AIMS & OBJECTIVES

**BRIEF OVERVIEW OF THE FUTURE AIMS AND OBJECTIVES SHOULD MENTIONED IN THIS SECTION**

**References**

**Teaching Methods**

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##### **Links for Electives/Rotations**

* [**https://gme.uchc.edu/programs/im/electiveselective.html**https://gme.uchc.edu/programs/im/electiveselective.html](https://gme.uchc.edu/programs/im/electiveselective.html)
* [http://medicine.buffalo.edu/departments/medicine/education/internalhttp://medicine.buffalo.edu/departments/medicine/education/internal-medicine/program/electives.htmlmedicine/program/electives.htmlhttp://medicine.buffalo.edu/departments/medicine/education/internal-medicine/program/electives.html](http://medicine.buffalo.edu/departments/medicine/education/internal-medicine/program/electives.html)
* [**http://www.umm.edu/professionals/gme/programs/im-residency/electives-and-research**http://www.umm.edu/professionals/gme/programs/im-residency/electives-and-research](http://www.umm.edu/professionals/gme/programs/im-residency/electives-and-research)
* [**https://internalmedicine.osu.edu/education/welcome/educational-career-development-programs/electives/**https://internalmedicine.osu.edu/education/welcome/educational-career-development-programs/electives/](https://internalmedicine.osu.edu/education/welcome/educational-career-development-programs/electives/)

**LINKS for curriculum**

* [https://elpaso.ttuhsc.edu/som/internal/IM\_Curriculum\_8-26-13.pdfhttps://elpaso.ttuhsc.edu/som/internal/IM\_Curriculum\_8-26-13.pdf](https://elpaso.ttuhsc.edu/som/internal/IM_Curriculum_8-26-13.pdf)
* [http://www.hkcp.org/docs/TrainingGuidelines/HKCP%20GuideBooklet%202011updated%2021.8.2013.pdfhttp://www.hkcp.org/docs/TrainingGuidelines/HKCP GuideBooklet 2011updated 21.8.2013.pdf](http://www.hkcp.org/docs/TrainingGuidelines/HKCP%20GuideBooklet%202011updated%2021.8.2013.pdf)
* [https://www.jrcptb.org.uk/sites/default/files/2009%20GIM%20%28amendment%202012%29.pdfhttps://www.jrcptb.org.uk/sites/default/files/2009 GIM (amendment 2012).pdf](https://www.jrcptb.org.uk/sites/default/files/2009%20GIM%20%28amendment%202012%29.pdf)
* [https://med.uth.edu/internalmedicine/files/2015/10/internal\_medicine\_curriculum\_acgme.pdfhttps://med.uth.edu/internalmedicine/files/2015/10/internal\_medicine\_curriculum\_acgme.pdf](https://med.uth.edu/internalmedicine/files/2015/10/internal_medicine_curriculum_acgme.pdf)
* [http://www.uhs.edu.pk/downloads/MS%20Internal%20Medicine.pdfhttp://www.uhs.edu.pk/downloads/MD Internal Medicine.pdf](http://www.uhs.edu.pk/downloads/MD%20Internal%20Medicine.pdf)

**Assessment methods**

* Center for Creative Leadership, Greensboro, North Carolina ([http://www.ccl.org](http://www.ccl.org/)).
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2. [http://education.med.ufl.edu/files/2010/10/InternalMedicineMilestones.pdfhttp://education.med.ufl.edu/files/2010/10/InternalMedicineMilestones.pdf](http://education.med.ufl.edu/files/2010/10/InternalMedicineMilestones.pdf)
3. [http://www.upstate.edu/medresidency/current/competencies.phphttp://www.upstate.edu/medresidency/current/competencies.php](http://www.upstate.edu/medresidency/current/competencies.php)

# **SECTION – viii APPENDICES( pROFORMAS/FORM)**

##### ***Workplace Based Assessments-Multi Source Feedback profoma- 360⁰ Evaluation Appendix “A”***



**Rawalpindi Medical University**

Quality Enhancement Cell

360 Degree Evaluation Proforma (by Senior) PGT, MO, HO Proforma

Reviewer Evaluation for

|  |  |  |
| --- | --- | --- |
|  | Name: |  |

Name:

|  |  |  |
| --- | --- | --- |
|  | Designation: |  |

Designation:

Performance ratings Assessment Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The following guidelines are to be used in selecting the appropriate rating:

1=Never 2= Rarely 3= Occasionally 4= Frequently 5= Always 6= Not Applicable

1. Patients Care

Implements the highest standards of practice in the effective and timely treatment of all patients regardless of gender, ethnicity, location, or socioeconomic status.

1

2

3

4

5

6

1. Neurosurgical Knowledge

Keeps current with research and neurosurgical knowledge in order to provide evidence-based care.

1

2

3

4

5

6

1. Interpersonal and Communication Sills

Works vigorously and efficiently with all involved parties as patient advocate and/or consultant.

1

2

3

4

5

6

1. Practice based Learning and Improvement

Assesses neurosurgical knowledge and new technology and implements best practices in clinical setting.

1

2

3

4

5

6

1. Professionalism

Displays personal characteristics consistent with high moral and ethical behaviour.

1

2

3

4

5

6

1. Systems Based Practice

Efficiently utilizes health-care resources and community systems of care in the treatment of patients.

1

2

3

4

5

6

Reference: Competencies identified by ACGME & ABMS

ACGME Accreditation Council for graduate neurosurgical education

ABMS American Board of Neurosurgical Specialties

360 Degree Evaluation Proforma (by Colleague) PGT, MO, HO Proforma



Reviewer Evaluation for

|  |  |  |
| --- | --- | --- |
|  | Name: |  |

Name:

|  |  |  |
| --- | --- | --- |
|  | Designation: |  |

Designation:

Performance ratings Assessment Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The following guidelines are to be used in selecting the appropriate rating:

1=Never 2= Rarely 3= Occasionally

Frequently

4=

Always

5=

Not Applicable

6=

1.

He/she is often late to work?

1

2

3

4

5

6

2.

He/she meets his deadlines oftenly?

1

2

3

4

5

6

3.

He/she is willing to admit the mistakes?

1

2

3

4

5

6

4.

He/she communicates well with others?

1

2

3

4

5

6

5.

He/she adjusts quickly to changing Priorities?

1

2

3

4

5

6

1. He/she is hardworking?

1

2

3

4

5

6

1. He/she works well with the other colleague?

1

2

3

4

5

6

8.

He/she co

-

worker behave professionally?

1

2

3

4

5

6

9.

He/she

co

-

worker treat you, respect fully?

1

2

3

4

5

6

10.

He/she co

-

worker handles criticism of his work well?

1

2

3

4

5

6

11.

He/she follow up the patient’s condition quickly?

1

2

3

4

5

6

Reference: http://www.surveymonkey.com/r//360-Degree-Employee-Evaluation-Template

360 Degree Evaluation Proforma (Self-Assessment) PGT, MO, HO Proforma



Reviewer Evaluation for

|  |  |  |
| --- | --- | --- |
|  | Name: |  |

Name:

|  |  |  |
| --- | --- | --- |
|  | Designation: |  |

Designation:

Performance ratings Assessment Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The following guidelines are to be used in selecting the appropriate rating:

1=Poor 2= Less than Satisfactory 3= Satisfactory

Good

4=

Very Good

5=

Don’t know

6=

1.

Clinical knowledge

1

2

3

4

5

6

2.

Diagnosis

1

2

3

4

5

6

3.

Clinical decision making

1

2

3

4

5

6

4.

Treatment (including practical procedures)

1

2

3

4

5

6

5.

Prescribing

1

2

3

4

5

6

6.

Neurosurgical record keeping

1

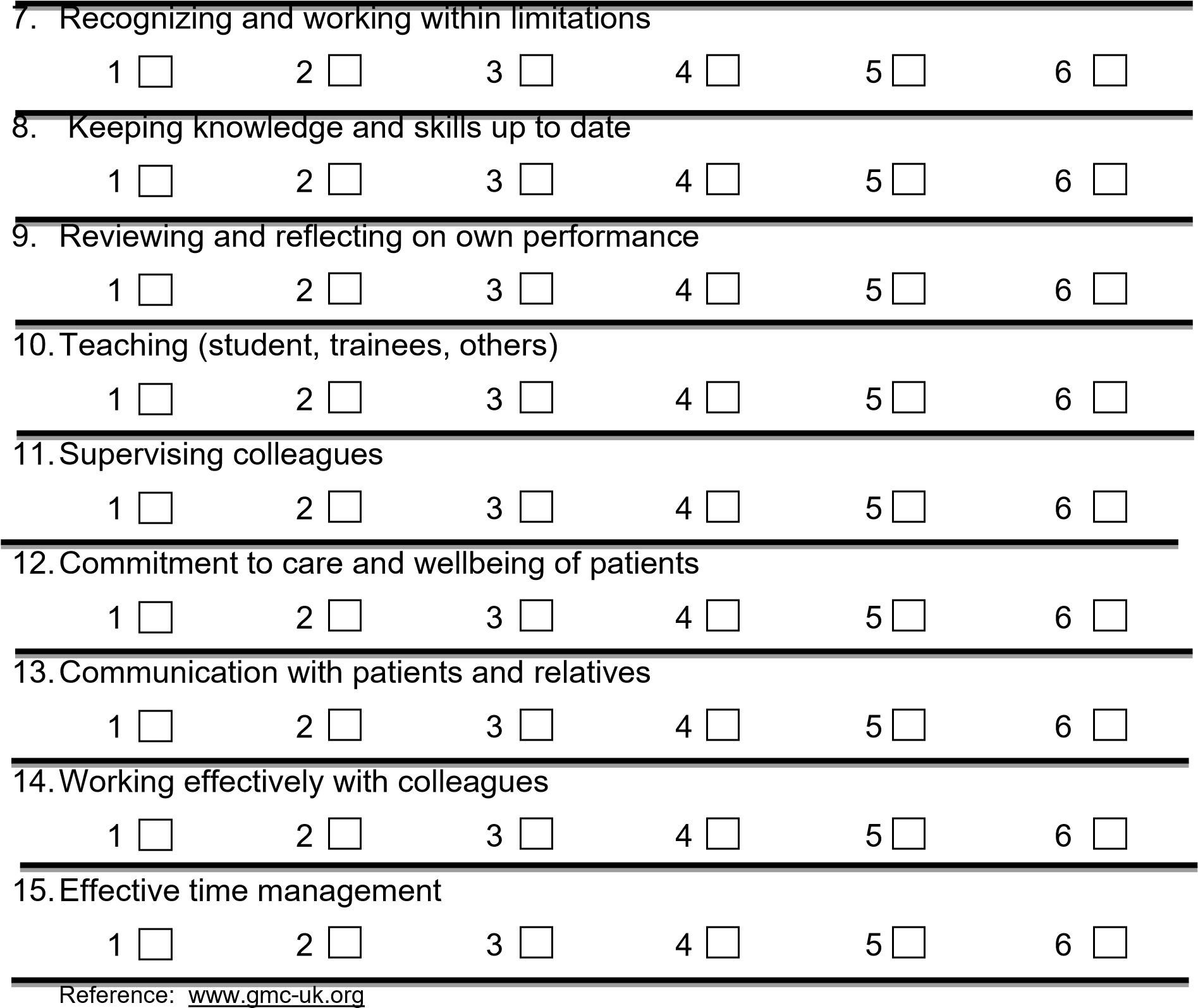
2

3

4

5

6



360 Degree Evaluation Proforma (by Paraneurosurgical Staff)

PGT, MO, HO Proforma

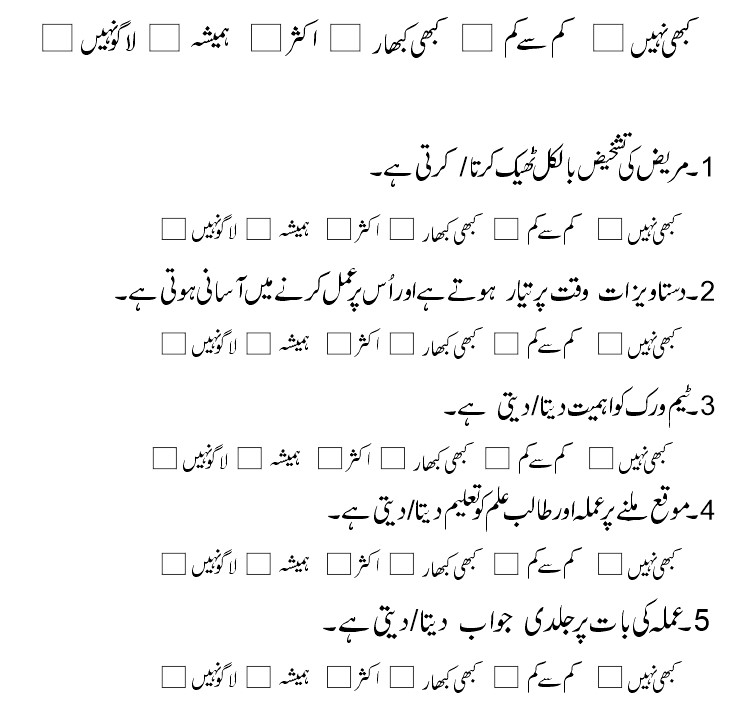
Reviewer Evaluation for

|  |  |  |
| --- | --- | --- |
|  | Name: |  |

Name:

|  |  |  |
| --- | --- | --- |
|  | Designation: |  |

Designation:



Performance ratings

Assessment Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

360 Degree Evaluation Proforma (by Attendant) PGT, MO, HO Proforma



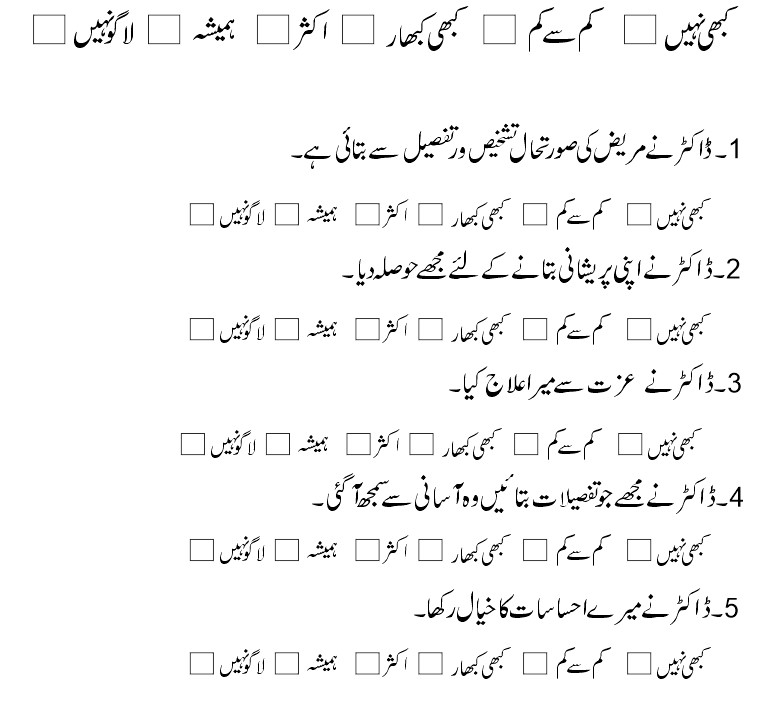
Reviewer Evaluation for

|  |  |  |
| --- | --- | --- |
|  | Name: |  |

Name:

|  |  |  |
| --- | --- | --- |
|  | Designation: |  |

Designation:



Performance ratings

Assessment Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

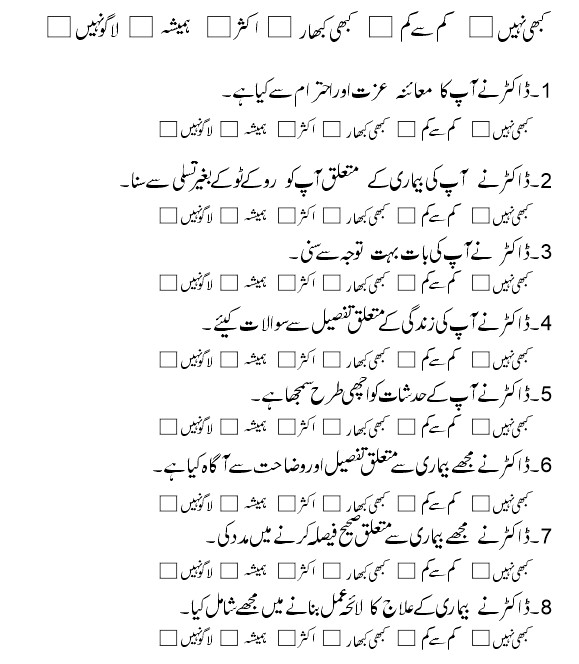
360 Degree Evaluation Proforma (by Patient) PGT, MO, HO Proforma



Reviewer Evaluation for

|  |  |  |
| --- | --- | --- |
|  | Name: |  |

Name:



Designation:

Designation:

Performance ratings

Assessment Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

###### ***Resident Evaluation by Nurse/ Staff for core competencies Appendix “B”***

Please take a few minutes to complete this evaluation form. All information is confidential and will be used constructively. You need not answer all the questions. Name of Resident\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Location of care or interaction\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(For example OPD/Ward/Emergency/Endoscopy Department)

Your position (for example: nurse, ward servant, endoscopy attendant)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S # | Professionalism | Poor | Fair | Good | V.Good | Excellent |  | Insufficient Contact |
| 1 | Resident is Honest and trustworthy |  |  |  |  |  |  |  |
| 2 | Resident treats patients and families with courtesy, compassion and respect |  |  |  |  |  |  |  |
| 3 | Resident treats me and other member of the tream with courtesy and respect |  |  |  |  |  |  |  |
| 4 | Resident shows regard for my opinions |  |  |  |  |  |  |  |
| 5 | Resident maintains a professional manner and appearance |  |  |  |  |  |  |  |
| Interpersonal and communication skills | | | | | | |  | |
| 6 | Resident communicates well with patients, families, and members of the healthcare team |  |  |  |  |  |  | |
| 7 | Resident provides legible and timely documentation |  |  |  |  |  |  | |
| 8 | Resident respect differences in religion, culture, age, gender, sexual orientation and disability |  |  |  |  |  |  | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| System based practice | | | | | | | |
| 9 | Resident works effectively with nurses and other professionals to improve patient care |  |  |  |  |  |  |
| Patient Care | | | | | | | |
| 10 | Resident respects patient preferences |  |  |  |  |  |  |
| 11 | Resident take care of patient comfort and dignity during procedures |  |  |  |  |  |  |
| Practice based learning and improvement | | | | | | | |
| 12 | Resident facilitates the learning of students and other professionals |  |  |  |  |  |  |
| Comments | | | | | | | |
| 13 | Please describe any praises or concerns or information about specific incidents |  |  |  |  |  |  |
| Thanks you for your time and thoughtful input. You play a vital role in the education and training of the Neurosurgery resident | | | | | | | |

**Poor: 0, Fair: 1, Good: 2, V.Good: 3, Excellent: 4**

**Total Score\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/52**

.

***Supervisor’s Annual Review Report.Appendix “C”***

This report will consist of the following components: -

* + 1. Verification and validation of Log Book of operations & procedures according to the expected number of operations and procedures performed (as per levels of competence) determined by relevant board of studies.
    2. A 90% attendance in academic activities is expected. The academic activities will include: Lectures, Workshops other than workshops, journal Clubs Morbidity & Mortality Review Meetings and Other presentations. III.Assessment report of presentations and lectures

IV. Compliance Report to meet timeline for completion of research project. V.Compliance report on personal Development Plan.

* 1. Multisource Feedback Report, on relationship with colleagues, patients.
  2. Supervisor will produce an annual report based on assessments as per proforma in appendix-G and submit it to the Examination Department.
  3. 75% score will be required to pass the Continuous Internal Assessment on annual review.

***Supervisor’s Evaluation of the Resident (Continuous Internal Assessment) Appendix “D”***

|  |  |
| --- | --- |
| **1** | **Unsatisfactory** |
| **2** | **Below Average** |
| **3** | **Average** |
| **4** | **Good** |
| **5** | **Superior** |

**Resident’s Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Evaluator’s Name(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Hospital Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date of Evaluation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***Please circle the appropriate number for each item using the scale above.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Patient Care** | |  | **Scale** | | |  |
| 1. | Demonstrates sound clinical judgment | **1** | **2** | **3** | **4** | **5** |
| 2. | Presents patient information case concisely without significant omissions or digressions | **1** | **2** | **3** | **4** | **5** |
| 3. | Able to integrate the history and physical findings with the clinical data and identify all of the patient’s major problems using a logical thought process | **1** | **2** | **3** | **4** | **5** |
| 4. | Develops a logical sequence in planning for diagnostic tests and procedures and Formulates an appropriate treatment plan to deal with the patient’s major problems | **1** | **2** | **3** | **4** | **5** |
| 5. | Able to perform commonly used office procedures | **1** | **2** | **3** | **4** | **5** |
| 6. | Follows age appropriate preventative medicine guidelines in patient care | **1** | **2** | **3** | **4** | **5** |
|  | **Neurosurgical Knowledge** |  | **Scale** | | |  |
| 1. | Uses current terminology | **1** | **2** | **3** | **4** | **5** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2. | Understands the meaning of the patient’s abnormal findings | **1** | **2** | **3** | **4** | **5** |
| 3. | Utilizes the appropriate techniques of physical examination | **1** | **2** | **3** | **4** | **5** |
| 4. | Develops a pertinent and appropriate differential diagnosis for each patient | **1** | **2** | **3** | **4** | **5** |
| 5. | Demonstrates a solid base of knowledge of ambulatory medicine | **1** | **2** | **3** | **4** | **5** |
| 6. | Can discuss and apply the applicable basic and clinically supportive sciences | **1** | **2** | **3** | **4** | **5** |
|  | **Professionalism** |  | **Scale** | | |  |
| 1. | Demonstrates consideration for the patient’ s comfort and modesty | **1** | **2** | **3** | **4** | **5** |
| 2. | Arrives to clinic on time and follows clinic policies and procedures | **1** | **2** | **3** | **4** | **5** |
| 3. | Works effectively with clinic staff and other health professionals | **1** | **2** | **3** | **4** | **5** |
| 4. | Able to gain the patient’s cooperation and respect | **1** | **2** | **3** | **4** | **5** |
| 5. | Demonstrates compassion and empathy for the patient | **1** | **2** | **3** | **4** | **5** |
| 6. | Demonstrates sensitivity to patient’s culture, age, gender, and disabilities | **1** | **2** | **3** | **4** | **5** |
| 7. | Discusses end-of-life issues (DPOA, advanced directives, etc.) when appropriate | **1** | **2** | **3** | **4** | **5** |
|  | **Interpersonal and Communication Skills** |  | **Scale** | | |  |
| 1. | Demonstrates appropriate patient/physician relationship | **1** | **2** | **3** | **4** | **5** |
| 2. | Uses appropriate and understandable layman’s terminology in discussions with patients | **1** | **2** | **3** | **4** | **5** |
| 3. | Patient care documentation is complete, legible, and submitted in timely manner | **1** | **2** | **3** | **4** | **5** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4. | Recognizes need for behavioral health services and understands resources available | **1** | **2** | **3** | **4** | **5** |
|  | **Systems-based Practice** |  | **Scale** | | |  |
| 1. | Spends appropriate time with patient for the complexity of the problem | **1** | **2** | **3** | **4** | **5** |
| 2. | Able to discuss the costs, risks and benefits of clinical data and therapy | **1** | **2** | **3** | **4** | **5** |
| 3. | Recognizes the personal, financial, and health system resources required to carry out the prescribed care plan | **1** | **2** | **3** | **4** | **5** |
| 4. | Demonstrates effective coordination of care with other health professionals | **1** | **2** | **3** | **4** | **5** |
| 5. | Recognizes the patient’s barriers to compliance with treatment plan such as age, gender, ethnicity, socioeconomic status, intelligence, dementia, etc. | **1** | **2** | **3** | **4** | **5** |
| 6. | Demonstrates knowledge of risk management issues associated with patient’s case | **1** | **2** | **3** | **4** | **5** |
| 7. | Works effectively with other residents in clinic as if a member of a group practice | **1** | **2** | **3** | **4** | **5** |
|  | **Osteopathic Concepts** |  | **Scale** | | |  |
| 1. | Demonstrates ability to utilize and document structural examination findings | **1** | **2** | **3** | **4** | **5** |
| 2. | Integrates findings of osteopathic examination in the diagnosis and treatment plan | **1** | **2** | **3** | **4** | **5** |
| 3. | Successfully uses osteopathic manipulation for treatment where appropriate | **1** | **2** | **3** | **4** | **5** |
| 4. | Practices Patient Centered Care with a “whole person” approach to medicine. | **1** | **2** | **3** | **4** | **5** |
|  | **Practice-Based Learning and Improvement** |  | **Scale** | | |  |
| 1. | Locates, appraises, and assimilates evidence from scientific studies | **1** | **2** | **3** | **4** | **5** |
| 2. | Apply knowledge of study designs and statistical methods to the appraisal of clinical studies to assess diagnostic and therapeutic effectiveness of treatment plan | **1** | **2** | **3** | **4** | **5** |
| 3.Uses information technology to access information to support diagnosis and treatment | | **1** | **2** | **3** | **4** | **5** |
| **Comments** | |  |  |  |  |  |
|  | |  |  |  |  |  |

**Resident’s Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Supervisor’s Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

***FACULTY EVALUATION OF RESIDENT (NEUROSURGERY)******Appendix “E”***

**Abbreviations for six Core Competencies**

* + PC = Patient Care
  + MK = Neurosurgical Knowledge
  + ICS = Interpersonal / Communication Skills
  + PBL = Practice-Based Learning and Improvement
  + P = Professionalism
  + SBP = Systems-Based Practice

***Interpersonal and Communication Skills***

Note content is appropriate and complete (ICS) (Question 1 of 24)

No

Interaction

Unsatisfactory

Failing

Less than

Marginal

Below

Avera

ge

Average

Above

Average

Advanced

Outstanding

Superior

0

1

2

3

4

5

6

7

8

9

Interpersonal skills with patients, families and staff is appropriate and skilled (ICS) (Question 2 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Presents cases in clear, concise manner (ICS) (Question 3 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

**Neurosurgical Knowledge**

Demonstrates understanding of clinical problems and their pathophysiology (MK) (Question 4 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Develops appropriate differential diagnosis (MK) (Question 5 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Evaluates scientific basis of diagnostic tests used (MK) (Question 6 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Reads service specific literature (MK) (Question 7 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

**Patient Care**

Obtains accurate clinical history (PC) (Question 8 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Demonstrates appropriate physical exam (PC) (Question 9 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Identifies and reviews relevant existing patient data (PC) (Question 10 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Prioritizes problems and treatment plans appropriately (PC) (Question 11 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Effectively uses consultation services (PC) (Question 12 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

**Practice-Based learning and improvement**.

Identifies areas for improvement and applies it to practice PBL (Question 13 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Applies lesions learned from neurosurgical errors into practice PBL (question 14 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Shows Interest in learning from complex care issues PBL (Question 15 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

**Professionalism**

Displays a professional attitude and demeanor (P) (Question 16 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Attends rounds on time. Handles criticism of self in pro-active way (P) (Question 17 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Cross-covers colleagues when necessary (P) (Question 18 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

**System-Based Practices**

Understands the different types of neurosurgical practice and delivery systems, and alternative methods of controlling health care costs and allocating resources (SBP) (Question 19 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Effectively Utilizes ancillary services SBP ( Questions 20 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Uses Patient care venues appropriately SBP (Questions 21 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Advocates for quality patient care and assists patients in dealing with system complexities SBP (Questions 22 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

**Overall / Summary**

Did resident meet course objectives? (Questions 23 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superior |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Comments (Please provide Strengths, Weaknesses and Areas for Improvement) (Question 24 of 24)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No  Interaction | Unsatisfactory | Failing | Less than  Marginal | Below  Average | Average | Above  Average | Advanced | Outstanding | Superio  r |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

##### ***RESIDENT EVALUATION OF FACULTY TEACHING SKILLS******Appendix “F”***

Faculty Member\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Department: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period of Evaluation\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Location\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Direction: please take a moment to assess the clinical faculty members teaching skills using this scale

**1= Poor 2=Fair 3= Very Good 4= Excellent**

**A.Leadership**

|  |
| --- |
|  |

Discussed expectations, duties and assignments for each 1 2 N/A team member and reviewed learning objectives and evaluation process

3

4

|  |
| --- |
|  |

|  |
| --- |
|  |

|  |
| --- |
|  |

Treated each tea, member in a cutout and peaceful manner 1 2

3

4

N/A

3

4

N/A

3

4

N/A

Was usually prompt for teaching assignments and was always 1 2

Available and accessible as a supervisor

Showed respect for the physician in other specialties / 1 2

Subspecialties as well as for other health care professionals

**Comments**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. **Role of modeling**

|  |
| --- |
|  |

Demonstrated positive in interpersonal communication 1 2 N/A skills with patients, family members and staff

3

4

|  |
| --- |
|  |

Enthusiasm and interest in teaching residents 1 2 N/A

3

4

|  |
| --- |
|  |

Recognized own limitations and used these 1 2 N/A

3

4

Situation as opportunities to demonstrate how he / she learn

|  |
| --- |
|  |

Used Neurosurgical / scientific literature to support clinical decisions 12 N/A

3

4

**Comments**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. **Patient Care /Teaching and & Feedback**

Demonstrate how to handle “difficult” patients encounters 1 N/A

2

3

4

2

3

4

Demonstrated how to perform special physical exam 1 N/A techniques and / or procedures and observed me during my initials attempt

Asked thought provoking questions to help me develop my 1 3 N/A critical thinking skills and clinical judgment

2

4

Share his/her own thought process when discussing patient 1 N/A workups and patients care decisions with the team

2

3

4

Highlighted important aspects of a patient case and often 1 3 N/A generalized to boarder neurosurgical concepts and principles

2

4

Integrated social / ethical aspects of neurosurgical 1 N/A

2

3

4

(cost containment, patents right , humanism) into discussion of patient care

Provided guidance and specific “instructive feedback 1 N/A to help me correct mistakes and / or increase my knowledge base

2

3

4

**Comments:**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. **Didactic (Classroom) Instructions**

Was usually prompt for teaching sessions, kept interruptions 1 N/A to minimum and kept discussion focused on case or topic

2

3

4

Gave lecture presentations that were well organized and 1 N/A

2

3

4

|  |  |  |  |
| --- | --- | --- | --- |
| “Interactive” () i.e., and review pertinent topics |  |  |  |
| Provided references or other materials that stimulated me to road, research and review pertinent topics | 1  2  3  4 | N/A |  |

**Comments**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. **Evaluation**

Reviewed my overall clinical performance at the end of the 1 N/A rotation pointed out my strengths and areas for improvement

2

3

4

Demonstrated “fairness” by adhering to established criteria, 1 N/A explaining reasons for the scores and following me to respond

2

4

**Comments**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Overall, I would rate this faculty member’s clinical teaching skills as**

|  |
| --- |
|  |

|  |
| --- |
|  |

POOR FAIR VERY GOOD  EXCELLENT

**Would you recommend that faculty member continue to teach in this programm?** Yes NO

COMMENTS, COMMENDATIONS OR CONCERNS

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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# **SECTION –iX Miscellaneous**

#### ***THE END***