

UNMRP
UNIVERSITY NATIONAL MEDICAL RESIDENCY
PROGRAM PAKISTAN

UNIFIED CURRICULA REGISTRY
MEDICAL UNIVERSITIES OF
PAKISTAN

CURRICULUM

**NEUROLOGY
(MD NEUROLOGY)**

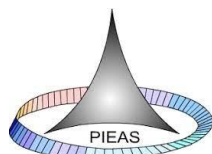


5 YEARS, FULL TIME, RESIDENTIAL, STIPENED BASED, CLINICAL
STRUCTURED TRAINING

UNIVERSITY NATIONAL MEDICAL RESIDENCY PROGRAM PAKISTAN



SUPERIOR UNIVERSITY



ZIAUDDIN UNIVERSITY



NUMS
NATIONAL UNIVERSITY
OF MEDICAL SCIENCES



رب هب لي حكماً

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World Health Organization



United Nations Academic Network (UNAN)
The UNESCO via the NEQMAP Bangkok

Note: All universities are included the international WHO directory discovered on the website of WHO and are duly recognized by the United Nations Academic Network (UNAN) and the UNESCO via the NEQMAP Bangkok

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STATUTES

Nomenclature of the Proposed Course

The name of degree program shall be “MD Neurology”.
This name is well recognized and established for the last many decades worldwide.

Course Title:

MD Neurology

Training Centers

Departments of Neurology (accredited by University) in its affiliated institutes

Duration of Course

The duration of MD Neurology course shall be five (5) years with structured training program in a recognized department under the guidance of an approved supervisor. After admission in MD Neurology Training Program, the resident will spend first 6 Months in the relevant Department of Neurology as **Induction period** during which resident will get orientation about the chosen discipline.

On completion of Induction period the resident will start formal training in the Basic Principles of Internal Medicine for 12 Months which includes 6 months in General Medicine and 6 months rotations in three (3) out of four (4) different specialties included Cardiology, Rheumatology, Pediatrics Neurosurgery and ICU. Duration of rotation will be for 2 months each. (1). (Appendix).

During this period the resident must get the research synopsis submitted in the university and approved by AS&RB and has attended all the mandatory workshops.

After completion of total 18 months training program, the candidate will take up Intermediate Examination.

During the next three and half years (42 months) of the training program, there will be three (3) components of the training.

- ❖ Clinical training in Neurology
- ❖ Research and Thesis Writing
- ❖ Rotations (2) (Appendix)

The candidate shall undergo clinical training to achieve educational objectives of MD

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Neurology (knowledge & skills) along with rotations in the relevant fields, which will be carried out during the 4th & 5th years of the Program. The clinical training shall be competency based. There shall be generic specialty specific competencies & shall be assessed by Continuous Internal Assessment (Appendix F&G).

Research Component and thesis writing shall be completed within the five years duration of the course. Candidates will spend total time equivalent one calendar year for research during the training program. Research can be done as one block or it can be done in the form of a regular periodic rotation over five years as long as total research time is equivalent to one calendar year.

Admission Criteria

i. Applications for admission in MD Neurology Training Program of University of Health Sciences will be invited at the most twice a year, through advertisement in print and electronic media mentioning the closing date of applications and date of Entry Examination along with admission criteria on an application format along with fee as prescribed from time to time.

ii. Eligibility

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

- ❖ Basic Medical Qualification of MBBS or an equivalent medical qualification recognized by Pakistan Medical Commission (PMC).
- ❖ Certificate of one year's House Job experience is essential at the time of the interview.

In case of incomplete house job, the applicant is required to submit Hope Certificate from the concerned Medical Superintendent that the House Job shall be completed before the interview.

- ❖ Valid certificate of permanent or provisional registration with Pakistan Medical Commission.

Entry Examination

- ❖ The candidate securing admission into MD Neurology Training programs shall be required to pass the entry test conduct under any name.
- ❖ The regulations notified from time to time shall govern the conduct of entrance examination.

Admission Process

- ❖ The admission process in public sector universities shall be central and in accordance with the policies of the government.
- ❖ University shall regulate the admission of private section institutions in

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accordance with
the regulations of PMC.

❖ The intake into MD Neurology program shall not be inconsistent with the regulations of PMC and policies of the government as the case may be.

Registration and Enrollment

As per policy of Pakistan Medical Commission the number of PG Trainees/
Students per supervisor shall be maximum 05 per annum for all PG
Programs of University including minor program (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 MD courses.

Candidates selected for the training program after their enrollment at the relevant
institutions shall be registered with University as per prescribed Registration
regulations.

Accreditation Related Issues of the Institution

1. Faculty

Properly qualified teaching staff in accordance with the requirements of Pakistan Medical and Dental Council (PMDC).

2. Adequate Space

Including class-rooms (with audiovisual aids), demonstration rooms, computer lab and clinical pathology lab etc.

3. Library

Departmental library should have latest editions of recommended books, reference books and latest journals (National and International).

- ❖ Accreditation of MD Neurology training program can be suspended on temporary or permanent basis by the University, if the program does not comply with requirements for residents training as laid out in this curriculum.
- ❖ Program should be presented to the university along with a plan implementation of curriculum for training of residents.
- ❖ Program should have documentation of residents training activities and evaluation on monthly basis/periodically.
- ❖ To ensure a uniform and standardized quality of training and availability of the training facilities, the University reserves the right to make surprise visits of the training program for monitoring purposes and may take appropriate action if deemed necessary.

AIMS AND OBJECTIVES OF THE COURSE

AIMS

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

GENERAL OBJECTIVES

MD Neurology training should enable a student to:

- ❖ Access and apply relevant knowledge to clinical practice:
 - Maintain updated specialty knowledge
 - Apply scientific knowledge in practice
 - Appropriate to patient need and context
 - To evaluate critically new technologies.
- ❖ Safely and effectively performs appropriate clinical skills & procedures:
 - Consistently demonstrate sound clinical skills
 - Demonstrate procedural knowledge and technical skill at a level appropriate to the level of training
 - Demonstrate manual dexterity required to carry out procedures
 - Adapt their skills in the context of each patient and procedure
 - Maintain and acquire new skills
 - Approach and carries out procedures with due attention to safety of patient, self and others
 - Critically analyze their own clinical performance for continuous improvement.
- ❖ Design and implement effective management plans:
 - Recognize the clinical features, accurately diagnose and manage neurological problems
 - Formulate a well-reasoned provisional diagnosis and management plan based on a thorough history and examination
 - Formulate a differential diagnosis based on investigative findings
 - Manage patients in ways that demonstrate sensitivity to their

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physical, social, cultural and psychological needs

Recognize disorders of the nervous system and differentiate those amenable to medical treatment

Effectively recognize and manage complications

Accurately identify the benefits, risks and mechanisms of action of current and evolving treatment modalities

Indicate alternatives in the process of interpreting investigations and in decision-making

Manage complexity and uncertainty

Consider all issues relevant to the patient

Identify risk

Assess and implement a risk management plan

Critically evaluate and integrate new technologies and techniques.

- ❖ Organize diagnostic testing, imaging and consultation as needed: Select medically appropriate investigative tools and monitoring techniques in a cost-effective and useful manner

Appraise and interpret appropriate diagnostic imaging and investigations according to patients' needs

Critically evaluates the advantages and disadvantages of different investigative modalities

- ❖ Communicate effectively:

Communicate appropriate information to patients (and their family) about procedures, potentialities and risks associated with surgery in ways that encourage their participation in informed decision making

Communicate with the patient (and their family) the treatment options including benefits and risks of each Initiate the resolution of misunderstandings or disputes Modify communication to accommodate cultural and linguistic sensitivities of the patients.

- ❖ Recognize the value of knowledge and research and its application to clinical practice:

Assume responsibility for self-directed learning

Critically appraise new trends in Neurology

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Facilitate the learning of others

- ❖ Appreciate ethical issues associated with Neurology:
 - Consistently apply ethical principles
 - Identify ethical expectations that impact on medico-legal issues
 - Recognize the current legal aspects of informed consent and confidentiality
 - Be accountable for the management of their patients.
- ❖ Professionalism by:
 - Employing a critically reflective approach to Neurology
 - Adhering with current regulations concerning workplace harassment
 - Regularly carrying out self and peer reviewed audit
 - Acknowledging and have insight into their own limitations
 - Acknowledging and learning from mistakes
- ❖ Work in collaboration with members of an interdisciplinary team where appropriate:
 - Collaborate with other professionals in the selection and use of various types of treatments assessing and weighing the indications and contraindications associated with each type
 - Develop a care plan for a patient in collaboration with members of an interdisciplinary team
 - Employ a consultative approach with colleagues and other professionals
 - Recognize the need to refer patients to other professionals
- ❖ Management and Leadership:
 - Effective use of resources to balance patient care and system resources
 - Identify and differentiate between system resources and patient needs
 - Prioritize needs and demands dealing with limited system resources.
 - Manage and lead clinical teams

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Recognize the importance of different types of expertise which
Contribute to the effective functioning of clinical team Maintain
clinically relevant and accurate contemporaneous Records

❖ Health advocacy:

Promote health maintenance of patients
Advocate for appropriate health resources allocation

MD Neurology

Principles of Internal Medicine

After 6 months of Induction period the resident will start training in basic Principles of Internal Medicine for 12 months. Resident should get exposure in the following organ and system competencies (listed below) while considering and practicing each system in terms of:

- ❖ Medical ethics
- ❖ Professional values, student teachers relationship Orientation of in-patient, out-patients and neurology labs Approach to the patient
- ❖ History taking
- ❖ General physical examination Systemic examination Routine investigations Special investigations
- ❖ Diagnostic and therapeutic procedures

Course Contents

1. Cardiovascular Medicine

Common and / or important Cardiac Problems

- ❖ Arrhythmias
- ❖ Ischaemic Heart Disease: Myocardial Infarction, acute coronary syndromes, stable angina
- ❖ atherosclerosis
- ❖ Heart Failure
- ❖ Hypertension—including investigation and management of hypertension
- ❖ Valvular Heart Disease
- ❖ Endocarditis
- ❖ Aortic dissection
- ❖ Syncope
- ❖ Dyslipidaemia

2. Diabetes & Endocrine Medicine

Common and / or Important Diabetic Problems:

- ❖ Diabetic ketoacidosis
- ❖ Non-acidotic hyperosmolar coma / severe hyperglycaemia Hypoglycaemia
- ❖ Care of the acutely ill diabetic Peri-operative diabetes care

Common or Important Endocrine Problems

- ❖ Hyper/Hypocalcaemia
Adrenocortical insufficiency
Hyper/Hyponatraemia
Thyroid dysfunction
Dyslipidaemia
- ❖ Endocrine emergencies: myxoedemic coma, thyrotoxic crisis, Addisonian crisis, hypopituitary coma, pheochromocytoma crisis

3. Gastroenterology and Hepatology

Common or Important GI and hepatobiliary Problems

- ❖ Peptic Ulceration and Gastritis
Gastroenteritis
- ❖ Iron Deficiency anaemia
- ❖ Acute abdominal pathologies: pancreatitis, cholecystitis, leaking abdominal aortic aneurysm

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- ❖ Functional disease: irritable bowel syndrome, non-ulcer dyspepsia
- ❖ Coeliac disease

Alcoholic liver disease

- ❖ jaundice, ascites, encephalopathy
- ❖ Liver cirrhosis
- ❖ Gastro-oesophageal reflux disease
- ❖ Nutrition: indications, contraindications and ethical dilemmas of nasogastric feeding and EG tubes, IV nutrition, re-feeding syndrome
- ❖ Viral hepatitis

4. Renal diseases

Common and / or Important diseases of the kidney

- ❖ Acute renal failure
- ❖ Chronic renal failure
- ❖ Glomerulonephritis
- ❖ Nephrotic syndrome
- ❖ Urinary tract infections
- ❖ Disturbances of potassium, acid/base, and fluid balance (and appropriate acute interventions)

5. Respiratory diseases

Common and / or Important Respiratory Problems:

- ❖ COPD
- ❖ Asthma
- ❖ Pneumonia
- ❖ Pleural disease: Pneumothorax, pleural effusion, mesothelioma
- ❖ Lung Cancer
- ❖ Respiratory failure and methods of respiratory support
- ❖ Pulmonary embolism and DVT
- ❖ Tuberculosis
- ❖ Interstitial lung disease
- ❖ Bronchiectasis
- ❖ Respiratory failure and cor-pulmonale
- ❖ Pulmonary hypertension

6. Haematology

Common and / or Important blood disorders and conditions

- ❖ Bleeding disorders: DIC, haemophilia
- ❖ Thrombocytopenia
- ❖ Anticoagulation treatment: indications, monitoring, management of over- treatment
- ❖ Transfusion reactions
- ❖ Anaemia: iron deficient, megaloblastic, haemolysis, sickle cell, Thrombophilia: classification; indications and implications of screening
- ❖ Haemolytic disease

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- ❖ Myelodysplastic syndromes Leukaemia
- ❖ Lymphoma Myeloma
- ❖ Myeloproliferative disease
- ❖ Inherited disorders of hemoglobin (sickle cell disease, thalassemia's)
- ❖ Amyloid

7. Infectious Diseases

Common and / or Important infectious diseases:

- ❖ Fever of Unknown origin
- ❖ Complications of sepsis: shock, DIC, ARDS
- ❖ Common community acquired infection: LRTI, UTI, skin and soft tissue infections, gastroenteritis
- ❖ HIV and AIDS including ethical considerations of testing Infections in immuno-compromised host
- ❖ Tuberculosis
- ❖ Anti-microbial drug monitoring Endocarditis
- ❖ non-gonococcal urethritis, gonorrhoea, syphilis
- ❖ Dengue Covid

8. Musculoskeletal System

Common or Important musculoskeletal Problems:

- ❖ Septic arthritis Rheumatoid arthritis Osteoarthritis Seronegative arthritis Crystal arthropathy
- ❖ Osteoporosis - risk factors, and primary and secondary prevention of complications of osteoporosis
- ❖ Polymyalgia and temporal arteritis
- ❖ Acute connective tissue disease: systemic lupus erythematosus, scleroderma, poly- and dermatomyositis, Sjogren's syndrome, vasculitides

Investigation Competencies

- ❖ Outline the Indications for, and Interpret the Following Investigations: Basic blood biochemistry: urea and electrolytes, liver function tests, bone biochemistry, glucose, magnesium
- ❖ Cardiac biomarkers and cardiac-specific troponin Creatine kinase
- ❖ Thyroid function tests Inflammatory markers: CRP / ESR Arterial Blood Gas analysis Cortisol and short Synacthen test HbA1C
- ❖ Lipid profile Amylase
- ❖ Full blood count Coagulation studies Hemolysis studies
- ❖ D dimer
- ❖ Blood film report
- ❖ Blood / Sputum / urine culture
- ❖ Fluid analysis: pleural, cerebro-spinal fluid, ascitic Urinalysis and urine microscopy
- ❖ Auto-antibodies Chest radiograph
- ❖ Abdominal radiograph, Ultrasound
- ❖ Joint radiographs (knee, hip, hands, shoulder, elbow, dorsal spine, and ankle) ECG
- ❖ Peak flow tests Pulmonary Functions Test

Procedural Competencies

- ❖ The trainee is expected to be competent in performing the following procedures by the end of core training. The trainee must be able to outline the indications for these interventions. For invasive procedures, the trainee must recognize the indications for the procedure, the importance of valid consent, aseptic technique, safe use of local anaesthetics and minimization of patient discomfort.
- ❖ Venepuncture
- ❖ Cannula insertion, including large bore Arterial blood gas sampling
- ❖ Lumbar Puncture
- ❖ Pleural tap and aspiration Central venous cannulation
- ❖ Initial airway protection: chin lift, Guedel airway(oropharyngeal airway), nasal airway, laryngeal
- ❖ mask
- ❖ Basic and, subsequently, advanced cardiorespiratory resuscitation Cytology: pleural fluid, ascitic fluid, cerebro-spinal fluid, sputum Urethral catheterization

- ❖ Nasogastric tube placement and checking

SPECIFIC LEARNING OUTCOMES

Residents completing MD Neurology training will have formal instruction, clinical experience, and will be able to demonstrate competence in the evaluation and management of adult and pediatric patients and applying scientific principles for the identification, prevention, treatment and rehabilitation of following acute and chronic neurological disorders:

- ❖ To provide a foundation of organized instruction in the basic neurosciences.
- ❖ To provide an opportunity to develop and maintain an investigative career in the basic neurosciences and clinical neurology.
- ❖ Demonstrate proficiency in the following areas:
 - ❖ The Neurological Examination (as an integral component of the general medical examination).
 - ❖ How to perform a focused but thorough neurological examination.
 - ❖ How to perform a neurological examination on patients with an altered level of consciousness.
 - ❖ How to recognize and interpret abnormal findings on the neurological examination
 - ❖ Localization- general principles for localization of different lesions.
 - ❖ Symptom Complexes - a systematic approach to the evaluation and differential diagnosis of Patients who present with different signs and symptoms.
 - ❖ Approach to Specific Diseases - general principles for recognizing, evaluating and managing various neurological conditions (either because they are important prototypes, or because they are potentially life-threatening).

Table of Specification (TOS)

(For 3 and half years specialty training of MD Neurology).

- ❖ **Disorders of Motility**
 - Motor Paralysis
 - Abnormalities of Movement and Posture Caused by Disease of the Basal Ganglia
 - Ataxia and Disorders of Cerebellum
 - Tremors
 - Myoclonus
 - Focal Dystonias
 - Tics
 - Disorders of Stance and Gait
- ❖ **Pain and Other Disorders of Somatic Sensation, Headache, and Backache**
 - Pain
 - Other Somatic Sensation
 - Headache and Other Craniofacial Pains
 - Pain in the Back
 - Pain in the Neck, and Extremities
- ❖ **Disorders of the Special Senses**
 - Disorders of Smell
 - Disorders of Taste
 - Disturbances of Vision
 - Disorders of Ocular Movement and Pupillary Function
 - Deafness, Dizziness, and Disorders of Equilibrium
- ❖ **Epilepsy and Disorders of Consciousness**
 - Epilepsy and Other Seizure Disorders
 - Coma and Related Disorders of Consciousness
 - Faintness and Syncope
 - Sleep and Its Abnormalities
- ❖ **Derangements of Intellect, Behavior, and Language Caused by Diffuse and Focal Cerebral Disease**

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- Delirium and other Acute Confusional States
 - Dementia
 - Amnesic Syndrome
 - Neurology of intelligence and Memory
 - Neurologic Disorders Caused by Lesions in Specific Parts of the Cerebrum
 - Disorders of Speech and Language
- ❖ **Disorders of Energy, Mood, and Autonomic and Endocrine Functions**
- Fatigue
 - Asthenia
 - Anxiety
 - Depression
 - The Limbic Lobes and the Neurology of Emotion
 - Disorders of the Autonomic Nervous System, Respiration, and Swallowing
 - The Hypothalamus and Neuroendocrine Disorders
- ❖ **Growth And Development of The Nervous System And The Neurology of Aging**
- Normal Development
 - Deviations in Development of the Nervous System
 - The Neurology of Aging
- ❖ **Major Categories of Neurologic Disease**
- Disturbances of Cerebrospinal Fluid, Including Hydrocephalus, Pseudotumor Cerebri, and Low-Pressure Syndromes
 - Intracranial Neoplasms/tumors and Paraneoplastic Disorders
 - Infections of the Nervous System (Bacterial, Fungal, Spirochetal, Parasitic) and Sarcoidosis
 - Viral Infections of the Nervous System, Chronic Meningitis, and Prion Diseases

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- Cerebrovascular Diseases
 - Craniocerebral Trauma
 - Multiple Sclerosis and Other Inflammatory Demyelinating Diseases
 - Inherited Metabolic Diseases of the Nervous System
 - Developmental Diseases of the Nervous System
 - Degenerative Diseases of the Nervous System
 - The Acquired Metabolic Disorders of the Nervous System
 - Diseases of the Nervous System Caused by Nutritional Deficiency
 - Alcohol And Alcoholism
 - Disorders of the Nervous System Caused by Drugs, Toxins, and *Chemical Agents*
- ❖ **Diseases of Spinal Cord, Peripheral Nerves, And Muscles**
- ❖ Diseases of the Spinal Cord
 - ❖ Electrophysiological and Laboratory Aids in the Diagnosis of Neuromuscular Disease
 - ❖ Diseases of the Peripheral Nerves
 - ❖ Diseases of the Cranial Nerves
 - ❖ Diseases of Muscle
 - ❖ Myasthenia Gravis
 - ❖ Other Disorders of the Neuromuscular Junction
 - ❖ The Myotonias
 - ❖ Periodic Paralysis
 - ❖ Cramps, Spasms, and States of Persistent Muscle Fiber Activity
- ❖ **Psychiatric Disorders**
- ❖ Anxiety
 - ❖ Hysteria
 - ❖ Personality Disorders
 - ❖ Depression
 - ❖ Bipolar Disease
 - ❖ Schizophrenia, Delusional and Paranoid States

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❖ Localization of Lesion in different parts of Nervous System

- Lower motor neuron
 - Muscle
 - Neuromuscular Junction
 - Nerve
 - Peripheral
 - Cranial
 - Plexus
 - Roots
 - Anterior Horn Cell
 - Dorsal root ganglion
- Upper motor neuron
 - Spinal cord
 - Brain
 - Pyramidal system
 - Extra Pyramidal system

❖ Extension of clinical examinations

- Imaging studies related to Nervous system
 - CT scan
 - MRI scan
 - Angiography
 - PET and SPECT scans
- Electrophysiological studies
 - EEG (Electro-encephalograms)
 - EMG (Electromyography)
 - NCS (Nerve Conduction Studies)
 - Evoked Potential studies (EP)
- Laboratory studies
 - CSF analysis & interpretation

ROTATIONS

1. Neurosurgery Rotation (02) Months

Neurology residents are required to spend a total of 2 months during their Neurology training in the Neurosurgery department. During this rotation, the residents will be expected to participate daily in the outpatient clinic settings as well as the inpatient consult services and related neurosurgical operative procedures as per departmental roster. Upon completion of this rotation, the neurology resident will be proficient in history-taking and physical examination of the neurosurgical patients as well as appropriate knowledge of management plans different types of neurosurgical patients.

2. Neuroradiology Rotation (03) Months

Each neurology resident will be assigned 3 months of neuroradiology during neurology training. It is crucial for a neurology resident to master this area in his/her training. The resident will perform preliminary interpretations of imaging studies and review the findings with the neuroradiologist. The resident will become proficient in the interpretation of the different neuroimaging tests including; Carotid Doppler Ultrasound, CT, MRI, MRA, angiography, myelography, SPECT and PET scans.

3. Neurophysiology Rotation 4 months (NCS/EMG/EEG)

NCS/EMG

Each resident will be assigned to the neurophysiology NCS/EMG for 3 months during their last year of neurology training.

During the rotation, each resident will be provided with a series of cases with electrophysiological data. The residents will be expected to interpret each case by the end of their rotation. These cases will be discussed in detail with the faculty. At the end of the rotation, each resident is required to enhance their “hands on” practice with adequate knowledge of interpretation individually.

EEG rotation

Each neurology resident will rotate in the EEG lab for one month during their rotation of neurophysiology. During this rotation, the primary objective for each resident is to

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learn the basics of electroencephalography (EEG) and evoked potentials (EP).

To accomplish this, residents must concentrate in several areas. First, residents should observe the process of applying electrodes to patients and then the recording phase itself of both EEG and EP studies. Secondly, residents must review and interpret individual EEGs and EPs on their own and have a preliminary report to present to the attending physician that is reviewing studies that day. At this time, the resident must be prepared to present their interpretation of that day's studies.

Formal teaching will be done at this time.

Finally, each resident is required to enhance their "hands on" experience with adequate reading of related topics. At the end of the rotation, the resident should feel relatively comfortable performing a rough interpretation of EEG and EP studies. The neurology resident on the EEG rotation will also cover the Epilepsy Monitoring Unit (EMU).

4. Psychiatry Rotation (02) Months

Residents will spend 2 months on the psychiatry consultation services. During this rotation, the neurology resident will develop skills in the assessment of psychiatric problems in a medical setting. The resident will gain an understanding of the interaction of medical and neurological conditions with psychiatric disorders.

5. Ophthalmology Rotation (01 Month)

A resident of MD Neurology will spend one month in ophthalmology department. During his rotation he must learn the basic eye examinations and other relevant investigations. The resident must learn approach to the Neuro-ophthalmology conditions and how to treat these conditions.

At the end of the rotation, residents should be familiar with different types of eye diseases related to the neurology and their appropriate treatment.

RESEARCH/ THESIS WRITING

Total of one year will be allocated for work on a research project with thesis writing.

Project must be completed and thesis be submitted before the end of training.

Research can be done as one block in 5th year of training or it can be stretched over five years of training in the form of regular periodic rotations during the course as long as total research time is equivalent to one calendar year.

Research Experience

The active research component program must ensure meaningful, supervised research experience with appropriate protected time for each resident while maintaining the essential clinical 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 surgical literature. Residents should be advised and supervised by qualified staff members in the conduct of research.

Clinical Research

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

- ❖ Research design
- ❖ Research involving human subjects including informed consent and operations of the Institutional Review Board and ethics of human experimentation.
- ❖ Data collection and data analysis
- ❖ Research ethics and honesty
- ❖ Peer review process

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

Laboratory Research

Bench Research

Participation in laboratory research is at the option of the resident and may be arranged through any faculty member of the Division. When appropriate, the research may be done at other institutions.

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Research involving animals

Each resident participating in research involving animals is required to:

- ❖ Become familiar with the pertinent Rules and Regulations of the University i.e. those relating to "Health and Medical Surveillance Program for Laboratory Animal Care Personnel" and "Care and Use of Vertebrate Animals as Subjects in Research and Teaching"
- ❖ Read the "Guide for the Care and Use of Laboratory Animals"
- ❖ View the videotape of the symposium on Humane Animal Care

Research involving Radioactivity

Each resident participating in research involving radioactive materials is required to

- ❖ Attend a Radiation Review session
- ❖ *Work with an Authorized User and receive appropriate instruction from him/her.*

METHODS OF INSTRUCTION/COURSE CONDUCTION

As a policy, active participation of students at all levels will be encouraged. Following teaching modalities will be employed:

- ❖ Lectures
- ❖ Seminar Presentation and Journal Club Presentations
- ❖ Group Discussions
- ❖ Grand Rounds
- ❖ Clinico-pathological Conferences
- ❖ SEQ as assignments on the content areas
- ❖ Skill teaching in ICU, emergency and ward settings
- ❖ Attend genetic clinics and rounds for at least one month.
- ❖ Attend sessions of genetic counseling
- ❖ Self-study, assignments and use of internet
- ❖ Bedside teaching rounds in ward
- ❖ OPD & Follow up clinics
- ❖ 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. 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.

1. 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 Physician on the Consultation Service, will prepare and present the case(s) and review the relevant literature.

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2. Monthly Student Meetings

Each affiliated medical college/institute approved to conduct training for MD Neurology 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 Neurology 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 (elected by the residents of the relevant discipline). 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.

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- ❖ 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 medical literature, clinical epidemiology, clinical study design, relative and absolute risks of disease, medical statistics and medical 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 and becoming familiar with Project Professionalism Manual such as that of the American Board of Internal Medicine.
- ❖ Residents should have instruction and experience with patient counseling skills and community education.
- ❖ This training should emphasize effective communication techniques for diverse populations, as well as organizational resources useful for patient and community education.
- ❖ Residents may attend the series of lectures on Nuclear Medicine procedures (radionuclide scanning and localization tests and therapy) presented to the Radiology residents.
- ❖ Residents should have experience in the performance of clinical laboratory and radionuclide studies and basic laboratory techniques, including quality control, quality assurance and proficiency standards.
- ❖ Each resident will observe and participate in each of the following procedures, preferably done on patients firstly under supervision and then independently.

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Annual Grand Meeting

Once a year all residents enrolled for MD Neurology should be invited to the annual meeting at University.

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.

LOG BOOK

The residents must maintain a log book and get it signed regularly by the supervisor. A complete and duly certified log book should be part of the requirement to sit for MD examination. Log book should include adequate number of diagnostic and therapeutic procedures observed and performed, the indications for the procedure, any complications and the interpretation of the results, routine and emergency management of patients, case presentations in CPCs, journal club meetings and literature review.

Proposed Format of Log Book is as follows:

Candidate's Name: _____

Supervisor _____

Roll No. _____

The procedures shall be entered in the log book as per format

Residents should become proficient in performing the related procedures. After observing the technique, they will be observed while performing the procedure and, when deemed competent by the supervising physician, will perform it independently. They will be responsible for obtaining informed consent, performing the procedure, reviewing the results

with the pathologist and the attending physician and informing the patient and, where appropriate, the referring physician of the results.

- ***Log book pages will be attached by University officials****

EVALUATION & ASSESSMENT STRATEGIES

Assessment

It will consist of action and professional growth oriented student-centered integrated assessment with an additional component of informal internal assessment, formative assessment and measurement-based summative assessment.

Student-Centered Integrated Assessment

It views students as decision-makers in need of information about their own performance. Integrated Assessment is meant to give students responsibility for deciding what to evaluate, as well as how to evaluate, it encourages students to 'own' the evaluation and to use it as a basis for self-improvement. Therefore, it tends to be growth-oriented, student-controlled, collaborative, dynamic, contextualized, informal, flexible and action-oriented.

In the proposed curriculum, it will be based on:

- Self Assessment by the student
- Peer Assessment
- Informal Internal Assessment by the Faculty

Self-Assessment by the Student:

Each student will be provided with a pre-designed self-assessment form to evaluate his/her level of comfort and competency in dealing with different relevant clinical situations. It will be the responsibility of the student to correctly identify his/her areas of weakness and to take appropriate measures to address those weaknesses.

Peer Assessment

The students will also be expected to evaluate their peers after the monthly small group meeting. These should be followed by a constructive feedback according to the prescribed guidelines and should be non-judgmental in nature. This will enable students to become good mentors in future.

Informal Internal Assessment by the Faculty

There will be no formal allocation of marks for this component of Internal Assessment so that students are willing to confront their weaknesses rather than hiding them from their instructors.

It will include:

- ❖ Punctuality
- ❖ Ward work
- ❖ Monthly assessment (written tests to indicate particular areas of

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weaknesses)

- ❖ Participation in interactive sessions

Formative Assessment:

Will help to improve the existing instructional methods and the curriculum in use.

Feedback to the faculty by the students:

After every three months students will be providing a written feedback regarding their course components and teaching methods. This will help to identify strengths and weaknesses of the relevant course, faculty members and to ascertain areas for further improvement.

Summative Assessment

It will be carried out at the end of the training program to empirically evaluate cognitive, psychomotor and affective domains in order to award degrees for successful completion of courses.

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RECOMMENDED BOOKS

INTERNAL MEDICINE: (available updated editions are preferred)

- ❖ Clinical Medicine: Textbook for Medical Students & Doctors. Kumar & Clark (editors). Elsevier Saunders, Edinburgh.
- ❖ Harrison's Principles of Internal Medicine by Eugene Braunwald. McGraw-Hill
- ❖ Davidson's Principles and Practice of Medicine by Nicholas A. Boon. Churchill Livingstone
- ❖ Hutchison's Clinical Methods in Medicine by Michael Swas. A. Saunders Ltd.

NEUROLOGY: (available updated editions are preferred)

- ❖ Principles of Neurology - Adams and Victor.
- ❖ Merritt's Textbook of Neurology - Lewis Roland.
- ❖ Memorix Neurology Peter Berlit. Chapman & Hall Medical.
- ❖ Localization in Clinical Neurology - Brazis, Masdeu, Biller.
- ❖ Neurology in Clinical Practice - Bradley, Daroff, Fenichel, Masdeu.
- ❖ Current Diagnosis & Treatment Neurology- John C.M. Brust
- ❖ Oxford Handbook of Neurology
- ❖ Samuels's Manual of Neurologic Therapeutics- Martin Samuels, Allan H. Ropper MD

****required annex will be attached by University officials****

Intermediate Examination

All candidates admitted in M.D. Neurology courses shall appear in Intermediate Examination after completion of 18 months training program (6 months in Neurology and 12 months in Medicine and allied rotations).

Eligibility Criteria:

The candidate appearing in Intermediate Examination of M.D. Neurology Programme is required:

- To have submitted certificate of completion of mandatory workshops.
- To have submitted certificate of completion of 18 months training signed by Supervisor for MD neurology and that of the supervisors where rotations are done.
- To have submitted CIS 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%.
- To have submitted Certificate of submission of synopsis to the university.
- To have submitted evidence of payment of examination fee as prescribed by the University from time to time.
- ❖ 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.
- ❖ The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.
- ❖ There is no bar on number of attempts in postgraduate training.

Intermediate Examination Schedule and Pattern

- ❖ Intermediate Examination will be held twice a year.
- ❖ There will be a minimum period of 30 days between submission of application for the examination and the conduct of examination
- ❖ The Intermediate Examination will comprise of a Written Examination and Clinical Examination.

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Written examination

- ❖ The written examination shall be based on prescribed curriculum
- ❖ The written examination will consist of 100 single best answer type Multiple Choice Questions.
- ❖ Each correct answer in the Multiple Choice Question paper shall carry 02 marks.
- ❖ The candidates scoring 75 % marks shall be declared pass and shall be eligible to appear in the clinical examination.

Clinical Examination

- ❖ After passing theory examination, the students shall take clinical examination.
- ❖ A maximum of four consecutive attempts whether availed or unavailed to pass Clinical/Oral examination will be permitted. However in case of failure to pass Clinical/Oral examination within stipulated attempts the credit of passing the written examination shall stand withdrawn and candidate shall have to take written examination, a fresh.
- ❖ Clinical Examination will evaluate patient care competencies.
- ❖ A panel of six examiners will be appointed by the Vice Chancellor.
- ❖ The examination will be based on Task Oriented and Clinical Assessments (TOACS).
- ❖ There will be 10 observed stations (a maximum of 3 static stations) of 10 marks each making a total of 100 marks.
- ❖ The candidates scoring 75% marks will be declared pass in the clinical examination.

Result Declaration

A candidate shall be declared pass in intermediate examination after passing written and clinical examination, independent of each other.

Final Examination

Final examination would be conducted for the candidates getting training in MD Neurology program during the program.

Eligibility Criteria:

- ❖ To appear in Final Examination, a candidate shall be required:
- ❖ Proof of having pass the intermediate Examination.
- ❖ To have submitted certificate of completion of 5 Years training signed by his/her Supervisor for MD Neurology and that of the Head of Departments where rotations are done.
- ❖ To have submitted the thesis.
- ❖ To have submitted evidence of submission of examination fee as decided by the university from time to time.
- ❖ The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.
- ❖ 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.

Schedule and pattern of Final Examination of MD Neurology

- ❖ Final examination will be held twice a year as per University Schedule.
 - ❖ The Final Examination will comprise of a Written, Clinical Examination and Thesis evaluations.
 - ❖ Total Marks of Final Examination shall be 1000. This shall include following components in which a candidate must score at least 75% marks in each to be declared pass;

Continuous Internal Assessments (CIA) 100 Marks

Written Examination 300 Marks

Clinical Examination 300 Marks

Thesis Examination 300 Marks

Continuous Internal Assessment (CIA)

- ❖ The cumulative score of all training years will be added together to provide a final cumulative score of Continuous Internal Assessments of all the trainees by the Supervisor to the Principal and to the PG Cell of the university to be forwarded to the examination department.
- ❖ The weightage of internal assessment in the final examination will be 10%.
- ❖ Continuous Internal Workplace Based Assessments will be done by the supervisors, that may be based on but not limited to:
 - Generic and Specialty Specific Competency Assessments
 - Multisource Feedback Evaluations
 - Assessment of Candidates' Training Portfolio

Written Examination

- ❖ Written examination of MD Neurology will be based on their curriculum and as specified in the assessment blueprint table of specifications as prescribed in the curricula. The written examination will consist of two papers;
 - Paper 1 shall comprise of hundred (100) single best answer type Multiple Choice Questions. Each correct answer in the Multiple Choice Question paper will carry 02 marks.
 - Paper 2 shall comprise of ten (10) Short Essay Questions, each carrying 10 marks.
- ❖ The candidates scoring 75 % marks in aggregate of Paper 1 and Paper 2 of the written examination will be declared pass and will become eligible to appear in the Clinical Examination.
- ❖ Candidates who pass written examination, shall be allowed a maximum of four consecutive attempts whether availed or unavailed to pass Clinical/Oral examination. However in case of failure to pass

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Clinical/Oral examination within stipulated attempts the credit of passing the written examination shall stand withdrawn and candidate shall have to take entire examination including written examination, afresh.

Clinical Examination

❖ Clinical Examination of MD Neurology will evaluate patient care competencies in detail. A panel of six examiners will be appointed by the Vice Chancellor.

The clinical examination will be based on:

- One Long Case of hundred marks
- Four Short Cases of 25 marks each
- TOACS (Task Oriented and Clinical Assessments) consisting of 10 observed stations of 10 marks each out of which two (02) stations will comprise of case based discussion based on the student portfolios.

❖ The candidates scoring 75% marks in aggregate of short case/ TOACS will be declared pass in the clinical examination.

Thesis Examination

- ❖ The Thesis shall be submitted to the Controller of Examination through Head of Institute.
- ❖ Submission of Thesis is a prerequisite for taking Final Theory Examination.
- ❖ Examiners shall be appointed by the Vice chancellor on recommendation of Controller of examination from a panel approved by Advance Studies & Research Board for evaluation of thesis.
- ❖ All MD Neurology thesis shall be evaluated by two local examiners and a foreign examiner.
- ❖ Thesis defense shall be held after approval of evaluation report by Advance Studies & Research Board (ASRB).
- ❖ Thesis defense shall be conducted by two local examiners who evaluated Thesis of the candidate.
- ❖ The candidate scoring 75% marks in Thesis defense examination will be declared as pass in the examination.

DECLARATION OF RESULT & AWARD OF DEGREE

A candidate having declared successful in all the components of examination i.e. Theory, Clinical and Thesis shall be declared pass and shall be conferred degree in the prescribed manner.

Submission / Evaluation of Synopsis

The candidates shall prepare their synopsis as per guidelines provided by the Advanced Studies & Research Board, available on university website. The research topic in clinical subject should have **30% component related to basic sciences and 70% component related to applied clinical sciences**. The research topic must consist of a reasonable sample size and sufficient numbers of variables to give training to the candidate to conduct research, to collect & analyze the data. Synopsis of research project shall be submitted during first 18 months of training programme before the Intermediate Examination of MD Neurology. The synopsis after review by an Institutional Review Committee, shall be submitted to the University for consideration by the Advanced Studies & Research Board, through the Principal / Dean /Head of the institution.

Submission of Thesis

- ❖ Thesis shall be submitted to the Controller of Examination through Head of Institute duly recommended by the supervisor at least 06 months prior to completion of MD Neurology Training program.
- ❖ The thesis along with a certificate of approval from the supervisor will be submitted to the Registrar's office, who would record the date /time etc. and get received from the Controller of Examinations within 05 working days of receiving.
- ❖ The minimum duration between approval of synopsis and submission of Thesis shall be one year.
- ❖ Submission of Thesis is a prerequisite for taking Final Theory Examination.
- ❖ The research thesis must be compiled and bound in accordance with the Thesis Format Guidelines approved by the University and available on website.
- ❖ The research thesis will be submitted along with the fee prescribed by the University.
- ❖ The thesis along with a certificate of approval from the supervisor will be submitted to the Registrar's office, who would record the date /time etc. and get received from the Controller of Examinations within 05 working days of receiving.
- ❖ The Controller of Examinations will submit a panel of Examiners to the Vice Chancellor within 07 days of submission of Thesis.
- ❖ Examiners shall be appointed by the Vice chancellor on recommendation of Controller of examination from a panel approved by Advance Studies & Research Board for evaluation of thesis.
- ❖ The Vice Chancellor shall return the final panel within 05 working days to the Controller of Examinations for processing and assessment. In case of any delay the Controller of Examinations

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- ❖ would bring the case personally to the Vice Chancellor.
- ❖ All MD Neurology Thesis shall be evaluated by two local examiners and a foreign examiner.
- ❖ Thesis defense shall be held after approval of evaluation report by Advance Studies & Research Board (ASRB).
- ❖ Thesis defense shall be conducted by two local examiners who evaluated Thesis of the candidate.
- ❖ The candidate scoring 75% marks in Thesis defense examination will be declared as pass in the examination.

Thesis Evaluation

- ❖ The thesis will be evaluated by the examiners within a period of 06 weeks
- ❖ The Controller of Examinations will make sure that the Thesis is submitted to examiners in appropriate fashion and a reminder is sent after every ten days.
- ❖ In case the examiners fail to complete the task within 06 weeks with 02 fortnightly reminders by the Controller of Examinations, the Controller of Examinations will bring it to the notice of Vice Chancellor in person
- ❖ In case of difficulty in finding an internal examiner for thesis evaluation, the Vice Chancellor would, in consultation with the concerned Deans, appoint any relevant person as examiner in super session of the relevant clause University Regulations.
- ❖ The total marks of thesis evaluation will be 300 and 75% marks will be required to pass the evaluation
- ❖ The thesis will be considered accepted, if the cumulative score of all the examiners is 75%.