



LIAQUAT UNIVERSITY
OF MEDICAL & HEALTH SCIENCES,
JAMSHORO, SINDH, PAKISTAN

CURRICULUM MD NEUROLOGY



DEPARTMENT OF NEUROLOGY

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PREFACE

In our dynamically evolving world, constant adaptation is crucial, and our educational system must keep pace with the ever-changing needs of society.

In the line with the modern teaching methods and ever evolving field of Neurology, it is crucial that neurology teaching should also to be reformed to prepare better clinicians. The old curriculum was uniform, discipline-based and teacher-centered but acknowledging the need of change, now more attention has been paid to curriculum reform. This curriculum offers;

- Elective, Structured and Problem Based, Student Centered Education
- More Integrated Clinical and Theoretical Education
- Better Learning Objectives to go beyond knowledge acquisition and fundamental clinical skills.

This curriculum delineates overarching concepts encompassing learning objectives, theoretical knowledge, clinical skills, as well as the attitudes and behaviors requisite for Neurologists

It emphasizes the skills required by neurologist for diagnosis and management. The purpose of this curriculum is to provide assistance to trainees for betterment of their cognitive and practical skills acquired during Training. By completion of the Neurology Training Program, trainees should be able to deliver unsupervised comprehensive medical care to patients with neurological disorders. Ultimate goal is to provide autonomy while ensuring appropriate supervision, and time for clinical care, education, research, and personal growth. Mastering every facet of this curriculum is the key objective. The anticipation is that every teaching, learning, and assessment linked with this curriculum will seamlessly integrate into the trainee's daily clinical routine. This is an evolving document any criticism, suggestions, advice from the

Readers and users of this document would be appreciated for correction

The Faculty of Neurology has played a pivotal role in shaping and refining this curriculum document, offering their expertise to ensure its comprehensive development.

The following Fellows deserve specific mention for their contribution

Dr. Abdul Hafeez Bughio Associate Professor of Neurology LUMHS

Dr. Muslim Ali Lakhair Associate Professor LUMHS

Prof. Dr. Manzoor Ali Lakhair

Chairman, Department of Neurology

Liaquat University of Medical

& Health Sciences, Jamshoro

ABOUT THE LUMHS

Liaquat university of medical health sciences is top ranked public sector medical university of Pakistan Located in the province of Sindh on the right bank of river Indus at Jamshoro.

MILE STONES

1. Started as a Medical School in 1881
2. Raised to the status of a Medical College in 1942.
3. Named as Liaquat Medical College in 1951.
4. Foundation Stone of Jamshoro Campus laid down in 1954.
5. Shifting to Jamshoro Campus completed in 1963
6. Beginning of Postgraduate Courses in 1963.
7. Dental Section & BDS Course added in 1963. In January 2001, Liaquat Medical College was upgraded to a full-fledged University, named "**Liaquat University of Medical & Health Sciences**". The former Liaquat Medical College was affiliated with University of Sindh
8. College of Pharmacy established in June 2015
9. Bilawal Medical College for Boys, LUMHS, Jamshoro, established in 2018
10. The College of Technology, LUMHS, Jamshoro, established in 2018 providing various undergraduate degree and Diploma programs in Diagnostic Radiology, Medical Laboratory Technology, Forensic Science, Blood Banking, Dentistry, neuroscience and Ophthalmology

VISION STATEMENT

Liaquat University of Medical & Health Sciences seeks to be a top-tier healthcare institution, producing ingenious academic leaders, medical researchers, and healthcare advocates to serve global community.

MISSION STATEMENT

Fostering ideal learning environment to ensure modern scientific evidence based practices by imparting critical knowledge, analytical and psychomotor skills, and professional dedication among healthcare students, under the umbrella of virtuous professional, moral and ethical standards.

DEPARTMENT OF NEUROLOGY

The Department of Neurology is committed to promoting excellence in teaching and research in order to produce competent and confident medical graduates as well as postgraduates who will take responsibility for their continued professional development.

It consists of **25 beds Ward** along with state of art **Prof. M. Abdullah Neurophysiology Lab** at LUH Jamshoro and 15 beds **Stroke Unit** at LUH Hyderabad. The faculty members of Department Neurology consist of highly qualified and well-experienced individuals providing teaching and training to undergraduate and postgraduate students.

The aim of the undergraduate course leading to the degree of MBBS is to educate students in the principles and practices of Neurology and to provide them with the ability to continue learning beyond graduation.

VISION STATEMENT

Department of neurology at Liaquat University of Medical & Health Sciences seeks to deliver exceptional health services in the field of neurology by producing neurology specialist, medical researchers, and healthcare advocates to serve global community. we strive to make enduring contributions to the advancement of neurological well-being in society.

MISSION STATEMENT

To provide ideal environment for modern scientific evidence based practices in the field of neurology by critical knowledge, analytical, psychomotor skills, and professional dedication among students /trainee with professional, moral and ethical standards.

TRAINING PROGRAMS

FCPS Neurology (CPSP program)
MD Neurology (LUMHS program)
DCN (LUMHS program)
BS Technologist Neuroscience (LUMHS program)

FACULTY

PROF. DR. MANZOOR ALI LAKHAIR

MBBS, FCPS (NEUROLOGY)
CHAIRMAN DEPARTMENT OF NEUROLOGY

DR. ABDUL HAFEEZ BUGHIO

MBBS, FCPS (NEUROLOGY)
ASSOCIATE PROFESSOR DEPARTMENT OF NEUROLOGY

DR. MUSLIM ALI LAKHIAR

MBBS, FCPS (NEUROLOGY)
ASSOCIATE PROFESSOR DEPARTMENT OF NEUROLOGY

GENERAL INFORMATION

ENTRY CRITERIA

MD neurology program will comprise of 5 years, exemptions of medicine rotations for those have passed FCPS medicine or MD or MRCP. One year exemptions for those have passed DCN.

Eligibility to apply for MD Neurology

- Candidate must pass MBBS
- One year house Job from PMDC recognized Institutions.
- Permanent valid registration with PM&DC
- MD PART –I (exempted to those have done FCPS Medicine/ Neurology, MRCP Medicine and MD Medicine)
PAPER1
Basic science
PAPER 2
Clinical Neurology
Format: MCQ (one best type) 100 marks. Each paper

In case of foreign candidate, valid registration with Medical Council of their country of origin must be produced.

AIM/GOAL

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.

The goals of five years M.D Neurology is to train residents to

- Clearly apply standards of latest knowledge and skills in practicing Neurology at secondary and tertiary care levels independently as demanded for post graduate courses in Pakistan by Pakistan Medical Commission /PMD, HEC Islamabad and other International medical registering authorities
- Have aware of the latest development in the field of neurology

RATIONALE

Neurological disorders are a major and increasing global health challenge, which accounts for a substantial portion of the disease burden worldwide. The overall global burden of neurological disorders has increased specially Stroke, headache, epilepsy and neurodegenerative disorders. The spectrum of diseases ranges from non-communicable disorders like stroke and neurodegenerative disorders to central nervous system infections. The burden of neurological disorders increasing especially in developing countries like in Pakistan.

This training program is structured keeping in view the need of the society. Following needs are identified through formal and informal discussion with the stakeholders.

Deficiency of the quality health care providers to public especially in remote areas in the field of Neurology.

- There is a dire need for competent specialists of Neurology in the community.

- There is also shortage of research database in the field of neurology, so this program will also enhance research in this field of neurology

ROLE AND RESPONSIBILITIES OF THE SUPERVISOR

The supervisor has to play a pivotal role in training of the candidates by imparting theoretical and practical knowledge with them. The supervisor is person with post-graduation qualification and must be approved as Supervisor by the CPSP / University having a vast experience of teaching and administration.

- The prime role of supervisor is to impart knowledge to the trainee in order to train him to diagnose and manage the acute and chronic neurologic problems with responsibility and efficiency.
- He is responsible to provide a conducive atmosphere for trainees learning.
- He is required to inform the authorities regarding any misconduct or irregularity of the candidates in due time.
- He is required to ensure that the trainee has completed the training in stipulated time as per requirement of the syllabus.
- He is required to submit a detailed report on the performance of candidates to Director Post graduation whenever required without any bias and inclination.

ROLE AND RESPONSIBILITIES OF RESIDENT.

Having provided the conducive atmosphere by the university the trainees are required to engage themselves in acquiring knowledge and enhance their capabilities in dealing with the patients in the stipulated period.

- The trainee should acquire a complete knowledge of the course he is entering in, in order to prepare him / her for the future.
- He / She should undergo his / her training with due sense of responsibility and dedication.
- He / She is required to fulfill the entire requirement appearing in the examination.
- Seminar presentation ,case presentation
- Postgraduates are expected to attend courses, seminars, lectures and other continuing medical education activities in the specialty throughout the training period.
- Each postgraduate resident shall do on-calls duties within the Hospital premises.
- Management of neurological emergencies in ER and inpatient setting
- Undertake regular resident on-call duties for inpatients,
- Manage patients attending Neurology Outpatient Clinic

RESEARCH

Residents inducted in the MD program should submit Synopsis duly approved by the supervisor before MTE examination.

The Candidate must submit and approved thesis six months before appearing in the MD Part-II Examination.

ROTATIONS

The residents of MD program should have to acquire competencies in following areas in addition to the training in the primary specialty.

ROTATIONAL POLICY:

University wishes to be more Resident friendly in its policies regarding rotations as given below:

- LUMHS prefers that all rotations must be completed within the same hospital in which the primary specialist training unit is located.
- In case, a specific rotational unit is not present in a given hospital but the primary unit is capable to deal with competencies related to those rotations, the parent supervisor can verify the entries for those rotational competencies and there will be no need to send the residents to a rotational unit outside the parent hospital
- The Residents will be sent for rotations outside the parent hospital only in cases where the acquisition of rotational competencies in parent hospital is not possible. The rotational competencies are laid down in the curriculum by the Faculty of the program. The parent supervisor shall make the requisition for the rotation to a specific center within the same city, preferably to a hospital with which a MoU is already signed. The duly approved supervisor of that rotational unit will supervise and verify the entries made by the resident and, shall also issue a rotation completion certificate (to be countersigned by the parent supervisor)
- The primary responsibility of verification of entries shall be of the rotational supervisor (if any), but the entries shall also be visible to the parent supervisor
- No resident, including for elective rotation, will be sent for rotation outside the city without prior permission of the Competent Authority, processed through NRP committee

SCHEDULE OF ROTATIONS

1ST YEAR	Neurology ward	12
	Medicine	06
2nd YEAR	Cardiology	02
	ICU	02
	Pulmonology	02
	Neurology	06
3rd YEAR	Neurophysiology	03
	Neuroradiology	03
	Psychiatry	02
4th YEAR	Neurosurgery	02
	Neuro-Rehabilitation	01
	Ophthalmology	01
	Neurology (Stroke Unit)	06
	Neurology Ward	12

MANDATORY WORKSHOPS AND COURSE

It is mandatory for all residents to attend the following certified workshops in the 3rd year of training:

- Introduction to Computer and Internet
- Research Methodology and Dissertation Writing
- Communication Skills
- Basic Life Support (BLS) Course

NOTE:

The workshops are conducted by the Department of Medical Education .The BLS course is conducted by the Advanced Skills Lab LUMHS. No resident will be allowed to appear in MTE examination without attending the above mentioned workshops and BLS course.

LOG BOOK

The logbook is mandatory for all the residents of MD program, residents should have to maintain a given format of log book, make entries of all work performed and the academic activities undertaken on a daily basis. The concerned supervisor is required to verify the entries made by the trainee. This system ensures timely entries by the trainee and prompt verification by the supervisor.

It also helps in monitoring the progress of trainees and the vigilance of the supervisors. The log book is to be submitted after signed by supervisor before MD Part-II examination form submission. **Annexure 1**

RESEARCH WORK

Every postgraduate resident of MD courses shall have to submit the approved copy of synopsis/Research Protocol at the end of 2nd year of training before appearing in MTE. The resident would be required to undertake a research project and to present the result for examination in the form of a thesis. They would be encouraged to publish the result of the project in HEC approved journals.

Mid Term Evaluation/ (MTE) Examination format and TOS

(After two years training Submission of synopsis)

Final exit examination Format and TOS

TRAINING PROGRAM

INTRODUCTION

The MD Neurology Training Program is a five-year structured program of the neurology department LUMHS Jamshoro. This Training Program is designed for education and training of physicians supervised by dedicated professional faculty of neurology/other specialties to make them competent in the fields of Clinical Neurology, Clinical Neurophysiology, Neuroradiology, Psychiatry and Neurosurgery. The resident of MD program will follow these competencies component and expected outcome is patient-centered (or population-centered) care.

- Knowledge and Critical Thinking
- Technical Skills
- Communication Skills
- Teamwork
- Research
- Professionalism
- Pedagogy
- Advocacy

This MD Neurology program aims to train the post-graduate students with all the necessary knowledge & all clinical skills such as history taking physical examination investigations making diagnoses and management, at par with international standards, required to be a leader in the field of neurology. This program will produce effective teachers with professional skills. This program aims at not only proficiency in professional and technical skills related to Neurology but also to enhance skills to be effective teachers and to enable our students to meet the health care and research needs of the country as well as globally.

AIM

The aim of this program MD in Neurology is to produce specialists & academicians who have attained the required competencies.

LEARNING OBJECTIVES

The learning objectives outline the specific requirements of learning. They provide a focus for identifying and detailing the required knowledge, skills, and attitudes. They also provide a context for specifying assessment standards and criteria as well as providing a context for identifying a range of teaching and learning strategies.

- To achieve holistic patient care through the provision of a broad and in-depth experiences in the diagnosis, investigation and treatment of neurological diseases.
- To provide opportunities for the acquisition of competence in managing acute emergencies and identifying neurological problems, as well as the proper management of patients referred by other doctors.
- To develop competence in the inpatient and outpatient management of chronic illnesses.
- To develop competence inpatient and outpatient management of neurological problems referred by family physicians/primary health care physicians as in selecting patients for referral for treatment modalities of high technology and / or the expertise of another specialty.
- To equip the trainee to manage a neurology unit in
- regional / district hospital to be a part in the health care delivery team and to work closely with networking units which provide convalescence, rehabilitation and long term care.
- To encourage development of communication skills and collaboration with the community, in order to contribute towards total health care delivery.
- To foster the development of skills in the critical appraisal of new methods of investigation and / or treatment.
- To reinforce self-learning and commitment to continued updating in all aspect of neurology.
- To encourage contribution aiming at advancement of knowledge in neurology and the teaching of junior trainees.
- To encourage the development of medical innovation through basic and / or clinical research.
- To equip the trainee to manage the electro Neurology physiology skill.
- To develop competence in the inpatient and outpatient management of physiotherapy & rehabilitation.

EXPECTED OUTCOMES AT THE COMPLETION OF TRAINING

By the end of the MD Neurology program, the resident will be able to:

- Localize the lesion in different neuroaxis
- Perform a detailed neurological examination for diagnosis

- Develop a plan of investigation and management
- Identify, differentiate, and manage different disorders of consciousness
- Identify the causes and manage delirium and other acute confusional state
- Identify the seizure types, diagnosis epilepsy and differentiate other seizure disorders, diagnose different epileptic syndromes for appropriate management.
- Identify, investigate and diagnose, and treat disorders of smell, deafness, vision related with neurological disorders Identify the causes of cerebellar dysfunction and equilibrium
- Identify and manage somatic pain and various types of Neuralgia, various types of headaches and craniofacial syndromes
- Diagnose and treat pain in the back, neck & extremities
- Describe neurology of intelligence, memory, emotions, and limbic system
- Diagnose, differentiate, and manage different types of dementia and amnesic syndromes
- Identify and manage disorders of speech and language dysfunction
- Diagnose, differentiate, and manage common causes and complications of acute and chronic infections of the nervous system.
- Diagnose neoplasms of the Nervous System and appropriate treatment and referral
- Diagnose and manage different para-neoplastic syndromes
- Diagnose strokes on clinical grounds ,recommend appropriate primary prevention of stroke ,provide pharmacological treatment & neuro-intervention techniques in acute stroke
- Advise appropriate secondary prevention and control of risk factors of stroke
- Emphasize the role of chronic rehabilitation in cerebrovascular disorders
- Describe the semiology of various abnormal movements
- Differentiate and manage various inherited & acquired movement disorders ranging from hypo-kinetic to hyper-kinetic presentations
- Diagnose and differentiate demyelinating disorders and, plan their short & long-term management
- Diagnose and manage the full spectrum of diseases of spinal cord
- Diagnose & manage the complete range of diseases of the nerves, neuromuscular

junctions and muscles

- Identify and promptly treat red flag headaches
- Diagnose and take immediate measures to treat raised intra-cranial pressure
- Manage emergent conditions such as status epilepticus, acute stroke, myasthenia crisis, Guillain-Barre syndrome, acute CNS infections and cervical cord pathologies
- Identify and treat hypertensive emergencies
- Examine the signs of brain-stem function and determine brain-stem death accurately
- Systemic Disorders including Nutritional Deficiencies & Toxicological Issues ,identify the manifestations of different nutritional deficiencies in the nervous system and manage them appropriately
- Recognize the neurological effects of various toxins and provide appropriate management plans

SCHEME OF MD NEUROLOGY TRAINING PROGRAM

A summary of five years course in MD Neurology is presented as under:

Course Structure	Theoretical component	Practical Component	Research Component
First two years of the Course.	Neurology (induction) Neuroanatomy Neurophysiology Neuropharmacology Neuropathology Principles of internal medicine Problem based approach to the disease	Clinical Examination General Physical Examination Neurological examination – Respiratory System – Cardiovascular System – GIT examination – Basic Procedures	Submission & approval of synopsis before appearing in MTE
Last three years of Course.	Elective rotations in medicine and other specialties Practice of Neurology with advance Training	Clinical Examination Long Case / Short Case Advanced Procedures EEG NCS/EMG Evoked Potential	Thesis to be submitted for evaluation & approval before appearing in the final exit examination

INSTRUCTIONAL METHODOLOGIES

The training program is expected to arrange the following teaching activities for all trainees as their routine instructional methods during a typical working week.

- Case Based Discussions: cases presented by residents before the faculty of Neurology of the training center. All trainees are expected to take turns in the presentation
- Journal Club
- Clinical Neurophysiology Conference
- Neurology, Neurosurgery and Radiology meetings (The consultants from radiology,

neurology & neurosurgery are required to participate in this teaching activity for the trainees, in which all interesting cases along with laboratory results, CT scans and MRI images are discussed)

Other Instructional Methodologies:

- Morbidity / Mortality review meetings
- Seminars, Conferences & Lectures
- Research Projects

WEEKLY WORKING SCHEDULE / TIME TABLE (CLINICAL & TEACHING SCHEDULE) OF MD RESIDENT

Activity	Frequency	Duration per session	Weekly equivalent (hrs)	Annual teaching weeks	Annual contact hours
General ward round	1 / week	2 hrs	2.0	32	64
Consultant round	1 / week	2 hrs	2.0	32	64
Departmental CME	1 / week	2 hrs	2.0	32	64
Journal club	1 / fortnight	2 hrs	1.0	32	32
Case presentation	1 / fortnight	2 hrs	1.0	32	32
Morbidity meeting	1 / month	2 hrs	0.5	32	16
Mortality meeting	1 / month	2 hrs	0.5	32	16
OPD (structured supervised learning)	1 / week	4 hrs	4.0	32	128
Clinical seminar	1 / month	1 hr	0.25	32	8
Protected research time	Weekly	6 hrs	6.0	32	192

Total structured teaching contact hours per year = 616 hours

Activities NOT counted as credit hours (mandatory service training)

Activity	Frequency	Duration	Reporting method
Night duties/on-call	2 per month (approx.)	36 hrs each	Logbook + supervisor sign-off
Emergency cover	As roster	Variable	Competency-based assessment

Credit-hour conversion used:

- **Theory / academic activity:** 1 credit hour = 1 hour/week
- **Practical / clinical / research:** 1 credit hour = 3 hours/week
- Annual system expressed as **two 16-week teaching blocks per academic year** (32 teaching weeks/year)

A. Credits per 16-week teaching block (½-year equivalent)

Component	Weekly hrs	Category	Formula	Credits/block
Academic teaching (rounds, CME, JC, case conf, M&M, seminars)	9.25	Theory	$9.25 \div 1$	9.25
OPD / supervised clinical learning	4.0	Practical	$4.0 \div 3$	1.33
Protected research	6.0	Practical/Research	$6.0 \div 3$	2.00

Total per block = $9.25 + 1.33 + 2.00 = 12.58$ credit hours

(Rounded to 2 decimal places)

B. Credits per academic year

Item	Credits
Credits per 16-week block	12.58
Blocks per year	$\times 2$
Credits per year	25.16 CH

C. TOTAL PROGRAM CREDIT HOURS (4 years)

Item	Credits
Credits per year	25.16
Years	$\times 5$
TOTAL MD PROGRAM CREDIT HOURS	125.8 CH

SYLLABUS

HISTORY AND CLINICAL EXAMINATION IN NEUROLOGY

- Basic concepts in neurology
- Neuroanatomy
- Neurophysiology
- Neuropathology
- Localization of lesion

HEADACHE & CRANIO FACIAL PAIN DISORDERS

- Headache
- Other craniofacial pains
- Pain in the back, neck, and extremities

EPILEPSY, EPILEPTIC SYNDROMES AND DISORDERS OF CONSCIOUSNESS

- Epilepsy and other seizure disorders
- Coma and related disorders of consciousness
- Encephalopathies
- Sleep disorders

DEMENTIA AND DELIRIUM

- Delirium and other acute confusional states
- Dementia
- Amnesic syndromes

INFECTIONS OF THE NERVOUS SYSTEM

- Bacterial
- Fungal
- Parasitic
- Viral
- Sarcoidosis

CEREBROVASCULAR DISEASES

- Infarction
- Hemorrhage
- Venous sinus thrombosis

MULTIPLE SCLEROSIS AND DEMYELINATING DISORDERS CNS

- Multiple sclerosis
- Neuromyelitis Optica spectrum disorders
- Other demyelinating disorders

DISORDERS OF CEREBELLUM AND EQUILIBRIUM

- Ataxia
- Vertigo

MOVEMENT DISORDERS

- Parkinson's disease
- Parkinson plus syndromes
- Other movement disorders

DISEASES OF THE SPINAL CORD

- Compressive myelopathies
- Non-compressive myelopathies

NEOPLASTIC AND PARANEOPLASTIC SYNDROME

- Primary tumors of the nervous system
- Neurocutaneous syndromes
- Metastatic disease of the nervous system
- Paraneoplastic syndromes

DISEASES OF THE CRANIAL NERVES NEUROMUSCULAR DISORDERS

- Myopathy
- Neuropathy
- Neuromuscular junction disorders
- Anterior horn cell disorders

NEURO-ELECTROPHYSIOLOGY

- Basic concepts in neurophysiology
- Electroencephalography (EEG)
- Nerve conduction studies and electromyography
- Evoked potentials
- Sleep studies
- Autonomic functions tests

METABOLIC DISORDERS OF THE NERVOUS SYSTEM

- Inherited metabolic disorders
- Acquired metabolic disorders

NEUROPHARMACOLOGY

- Disorders of the nervous system due to drugs, toxins and other chemical agents

NEUROLOGICAL MANIFESTATIONS OF SYSTEMIC DISORDERS AND PREGNANCY

- Systemic autoimmune disorders
- Metabolic disorders
- Systemic infections
- Endocrine disorders
- Disorders related to pregnancy and postpartum state

MISCELLANEOUS

- Nutritional deficiencies
- Developmental disorders of the nervous system

CORE COMPETENCIE

A specialist must have these core competencies which are varied, complex but required during training in the department of Neurology. The level of competencies to be achieved each year is specified, list is as follows

- Observer Status
- Assistant Status
- Performed under Direct Supervision
- Performed under Indirect Supervision
- Performed Independently

FIRST YEAR

OBJECTIVES	COMPETENCIES	01-06 MONTHS		07-012 MONTHS		TOTAL NUMBER OF CASES
		LEVEL	CASES	LEVEL	CASES	
To evaluate patient by History Taking, Performing Examination, Ordering / interpretation of Investigations, Formulating a diagnosis Of Patients With neurological disorders and plan for management.	HISTORY & EXAMINATION	3	25	4	25	50
	LUMBAR PUNCTURE	1	2	2	3	5
	CT SCAN (INTERPRETATION)	1	10	2	10	20
	MRI SCAN (INTERPRETATION)	1	5	1	5	10
	ANGIOGRAPHY (INTERPRETATION)	1	2	2	3	5
	ELECTR-ENCEPHALOGRAPHY (EEG)	1	3	2	7	10
	NERVE CONDUCTION STUDIES (NCS)	1	3	1	7	10
	ELECTRO-MYOGRAPHY (EMG)	1	2	2	3	5
	EVOKED POTENTIALS	1	2	2	3	5

SECOND YEAR

MEDICINE,CARDIO,PULMO AND ICU

OBJECTIVES	COMPETENCIES	13-18 MONTHS		19-24 MONTHS		TOTAL NUMBER OF CASES
		LEVEL	CASES	LEVEL	CASES	
To evaluate patient by History Taking, Performing Examination, Ordering / interpretation of Investigations, Formulating a diagnosis Of Patients With Medicine Cardio Pulmo disorders and patient in ICU for management .	HISTORY & EXAMINATION	1-3	25	4-5	25	50
	NASOGASTRIC INTUBATION	1-2	5	3-4-5	10	15
	X –RAY (INTERPRETATION)	1-2	10	3-4-5	10	20
	ECG (INTERPRETATION)	1-2	10	3-4-5	10	20
	ABG INTERPRETATION	1	3	2-3	7	10
	INSERATION OF CVP LINES	1-2	2	3-4	3	5
	ENDOTRACIAL INTUBATION	1	2	2	3	5
	URETHRAL CATHETERIZATION	1-2	5	3-5	10	15
	CARDIO PULMONARY RESUSCITATION CPR	1	2	3-4	3	5

THIRD YEAR TO FOURTH YEAR ROTATIONS
NEUROPHYSIOLOGY, PSYCHIATRY, NEUROSURGERY, NEURORADIOLOGY AND
NEUROOPHTHALMOLOGY
NEUROPHYSIOLOGY 3 MONTH

COMPETENCIES	LEVEL	CASES
ELECTROENCEPHALOGRAPHY (EEG)	4-5	50
NERVE CONDUCTION STUDIES (NCS) & ELECTROMYOGRAPHY (EMG)	3-4	25
EVOKED POTENTIAL STUDIES	3-4	15
AUTONOMIC TESTING	3	10
SLEEP STUDIES IN HEALTH & DISEASE STATES	2-3	5

PSYCHIATRY 2 MONTH

COMPETENCIES	LEVEL	CASES
ANXIETY	3-5	20
DEPRESSION	3-5	25
SCHIZOPHRENIA	3	10
DELUSION	3	5
PERSONALITY DISORDERS	3-4	5

NEUROSURGERY 2MONTH

COMPETENCIES	LEVEL	CASES
PRE-OPERATIVE EVALUATION FOR SURGERY	3-4	25
POST-OPERATIVE CARE OF PATIENTS	3-4	25
EARLY DETECTION OF POST-OPERATIVE COMPLICATIONS	3-4	20
EVALUATION & RESUSCITATION OF PATIENTS WITH HEAD INJURY	3	15
PATIENT SELECTION FOR BURR HOLE FOR DECOMPRESSION	2	10
PATIENT SELECTION FOR LUMBO-PERITONEAL SHUNT	2	5
PATIENT SELECTION FOR VENTRICULOPERITONEAL SHUNT	2	5

DIAGNOSTIC RADIOLOGY [NEURORADIOLOGY] 3MONTH

COMPETENCIES	LEVEL	CASES
<u>PLAN & INTERPRET:</u>		
PLAIN X-RAY	4-5	100
CT SCAN	4-5	80
MRI SCAN	3-4	100
ANGIOGRAPHY	3	40

OPHTHALMOLOGY [NEURO-OPHTHALMOLOGY] ONE MONTH

COMPETENCIES	LEVEL	CASES
<u>IDENTIFY AND DIAGNOSE:</u>		
GLAUCOMA	3	15
PUPILLARY ABNORMALITIES	4	30
EXTRA-OCULAR MUSCLE (EOM) DISORDERS	4-5	50
RETINOPATHIES	4	20
PERFORM FUNDOSCOPY	5	50
FIELD OF VISION TESTING	5	25

FINAL YEAR

OBJECTIVES	COMPETENCIES	49-51 MONTHS		51-53 MONTHS		54-57 MONTHS		58-MONTHS		TOTAL NUMBER OF CASES
		LEVEL	CASES	LEVEL	CASES	LEVEL	CASES	LEVEL	CASES	
To evaluate patient by History Taking, Performing Examination, Ordering / interpretation of Investigations, Formulating a diagnosis Of Patients With neurological disorders and plan for management.	HISTORY & EXAMINATION	5	25	5	25	5	25	5	25	100
	LUMBAR PUNCTURE	4	10	4	15	4	15	4	15	55
	NASOGASTRIC INTUBATION	4	10	4	10	4	10	4	10	40
	CT SCAN (INTERPRETATION)	3	20	3	20	4	20	4	20	100
	MRI SCAN (INTERPRETATION)	3	20	3	20	3	20	3	20	100
	ANGIOGRAPHY (INTERPRETATION)	3	10	3	10	3	10	3	10	40
	ELECTROENCEPHALOGRAPHY (EEG)	3	25	3	25	3	25	3	25	105
	NERVE CONDUCTION STUDIES (NCS)	3	25	3	25	3	25	3	25	105
	ELECTROMYOGRAPHY (EMG)	3	10	3	10	3	10	3	10	20
	EVOKED POTENTIALS	2	2	2	2		2	3	2	8

ASSESSMENT

Assessment of trainees will cover the cognitive, psychomotor and affective domains. It will take two forms

- Formative Assessment
- Summative Assessment

FORMATIVE ASSESSMENT

It is the continuous assessment of progress and competence. It will be conducted through workplace based assessment throughout the training. Workplace-Based Assessment (WPBA) tools are entirely formative and should be accompanied by constructive feedback. Formative Assessment will be undertaken by a range of assessors and will cover a range of procedures appropriate to the stage of training. • The Parent Supervisor is responsible for arranging WPBA sessions and may conduct the assessment themselves or delegate it to another competent faculty member or assessor within the department

Assessment will include

- Directly observed practical skills (DOPS)
- Case based discussion (CBD)
- Mini clinical examination exercises (Mini-CEX)
- Multiple source feedback (MSF)

Direct observation of the encounter by the Assessor is a must, followed immediately by specific and constructive feedback to the resident

SUMMATIVE ASSESSMENT

Summative assessment will be held twice

- Mid Term Assessment (MTE) Examination (At the end of 2nd year)
- Final/Exit Examination (At the end of Final Year)

MINI-CLINICAL EVALUATION EXERCISE (MINI-CEX)

Mini-CEX encounters will be arranged to cover/assess skills of History taking, Clinical Examination, Management & Communication Skills (including Counseling) [Any one of the above mentioned areas may be focused during a particular encounter].

Topics' List for Mini-CEX All categories of topics given below will have to be covered at least once and minimum of one Mini-CEX may be performed in each quarter:

- Epilepsy
- Movement Disorders
- Headache
- Neuropathy
- Myopathy
- NMJ Disorders
- Demyelinating Disorders
- Stroke
- Dementia
- Myelopathy
- CNS Infections
- Systemic Diseases

Miscellaneous (Cases of Trauma/Tumors/ Paraneoplastic Syndromes/ Mitochondrial Disorders)

DIRECT OBSERVATION OF PROCEDURAL SKILLS (DOPS)

All types of procedures given below will have to be completed at least once on a patient and minimum of one DOPS may be performed in each quarter

- Lumbar Puncture
- Motor or Sensory Nerve Conduction Study
- Electromyography
- Electroencephalography
- Evoked potentials
- Repetitive nerve Stimulation
- Each Mini Clinical Evaluation Exercise (Mini-CEX) or Direct Observation of Procedural Skills (DOPS) encounter lasts approximately 20 minutes, with an additional 5 minutes allocated for feedback and further action planning
- The topics given below are to be covered in any order as per availability of cases; however, each time focus should be on a different area/procedure/topic (at least one Mini CEX & one DOPS in each quarter)
- The resident has the onus to report to the Parent Supervisor when they are prepared to appear for either a Mini-CEX or DOPS session

SUMMATIVE ASSESSMENT

Eligibility requirements for appearing in MD NEUROLOGY examination a candidate should have: Provide a certificate of having passed the MTE Provide a certificate of attendance of mandatory workshops.

Completion of entries in -logbook along with validation by the supervisor

Provided evidence of publication of one research paper in a HEC/PMDC approved journal OR thesis on research topic approved by supervisor, through the Dean to the Controller of Examination.

FORMAT & TABLE OF SPECIFICATION MTE

Table of specification for Mid Term Evaluation (MTE) and Examination is here as under:

MD Neurology

Theory

Clinical and OSCE

There will be one best type multiple choice question

- Theory Paper 1 (BCQs) 100 Marks
- Theory Paper 2 (BCQs) 100 Marks 60% in each paper will considered pass
- Once Candidate Pass Theory Paper, He Is Eligible for TOACS (3 Attempts) 100 marks
- TOACS 10- Stations. 2 interactive 8 static Clinical
- One long case 50 marks
- Two short cases 50 marks 25 each case.

To be successful in the examination the candidates must secure minimum (60%) marks in all these components with aggregate marks should not be less than 60% marks.

TOS FOR MIDTERM EXAMINATION

TOS ID Title	Title	Weightage			Percentage	BCQS
		C1	C2	C3		
NEU-1	Basic Principles of Neurology	25	15	10	50	50
MED-2	General Medicine	07	05	03	15	15
MED-3	Cardiology	05	03	02	10	10
MED-4	Gastroenterology	03	01	01	05	05
MED-5	Nephrology	03	01	01	05	05
MED-6	Infectious Diseases	03	01	01	05	05
MED-7	Pulmonology	03	01	01	05	05
MED-8	Endocrinology	02	02	01	05	05
Total					100	100

FORMAT&TABLE OF SPECIFICATION FINAL /EXIT EXAMINATION

Theory 200 Marks

Paper I BCQs 100 Marks

Paper II BCQs 100 Marks

TOACS and clinical

- Long Case (One) (100 Marks)
- Short Case (Four) (100 Marks)
- TOACS (100 Marks)

Thesis Defense 100 Marks

Total 600 marks

To be successful in the examination the candidates must secure minimum (60%) marks in all these components with aggregate marks should not be less than 60% marks.

- Results Tabulation
- Result submission to university
- Declaration of result
- Degree awarding by university

TOS FOR FINAL / EXIT EXAMINATION

TOS ID Title	Title	Weightage			Percentage	BCQS
		C1	C2	C3		
Paper 1						
NEU-1	Cerebrovascular diseases	16	06	04	26	26
NEU-2	Movement disorders	14	04	02	20	20
NEU-3	Neuromuscular disorders	12	04	04	20	20
NEU-4	Muscle Disorders	08	04	02	14	14
NEU-5	Neuropathies	06	04	02	12	12
NEU-6	Pediatric neurology	04	02	02	08	08
Total					100	100
Paper 2						
NEU-87	Epilepsy	16	06	04	26	26
NEU-8	Headache Disorders	12	06	06	24	24
NEU-9	CNS infections	12	04	04	20	20
NEU-10	Anterhor cell disorders	06	02	02	10	10
NEU-11	Demyelinating diseases	06	04	02	12	12
NEU-12	Systemic and metabolic disorders affecting CNS	04	02	02	08	08
Total					100	100

TOS FOR CLINICAL EXAMINATION
10 TOACS-Stations (100 Marks)
(7 minutes each station)

TOS ID	TITLE	STATIONS
NEU-01	Neurological diagnosis and management	01
NEU-02	Electrophysiology	01
NEU-03	Nerve conduction/Electromyography	01
NEU-04	Neuroimaging CT	01
NEU-05	Neuroimaging MRI	01
NEU-06	Counseling	01
NEU-07	Movement Disorders Video	01
NEU-08	Applied Pharmacology	01
NEU-09	Emergency Scenario	01
NEU-10	Management Scenario	01
Total		10

LEARNING RESOURCES

List of Essential Readings

BOOKS:

INTERNAL MEDICINE:

- Clinical Medicine: Textbook for Medical Students & Doctors. Kumar & Clark (editors). 6th edition (2006). Elsevier Saunders, Edinburgh.
- Harrison's Principles of Internal Medicine by Eugene Braunwald. 16th Ed. McGraw-Hill
- Davidson's Principles and Practice of Medicine by Nicholas A. Boon 20th edition. Churchill Livingstone
- Hutchison's Clinical Methods in Medicine by Michael Swash. 21st edition. A. Saunders Ltd.

NEUROLOGY:

- 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.

JOURNALS:

- Issues of last two years of the following journals:
- Journal of Neurology, Neurosurgery and Psychiatry
- Journal of American Academy of neurology
- Movement Disorders in clinical practice
- New England journal of Medicine

Annexure 1

LOG BOOK

Proposed Format of Log Book is as follows:

Candidate's Name: _____

Roll No. _____

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

Procedures Performed

Sr. No.	Date	Name of Patient, Age, Sex & Admission No.	Diagnosis	Procedure Performed	Supervisor's Signature
1.					
2.					
3.					
4.					

Emergencies Handled

Sr. No.	Date	Name of Patient, Age, Sex & Admission No.	Diagnosis	Procedure Management	Supervisor's Signature
1.					
2.					
3.					
4.					

Case Presented

Sr. No.	Date	Name of Patient, Age, Sex & Admission No.	Case Presented	Supervisor's Signature
1.				
2.				
3.				
4.				

Seminar/Journal Club Presentation

Sr. No.	Date	Topic	Supervisor's Signature
1.			
2.			
3.			
4.			

Evaluation Record

(Excellent, Good, Adequate, Inadequate, Poor)

At the end of the rotation, each faculty member will provide an evaluation of the clinical performance of the fellow.

Sr. No.	Date	Method of Evaluation (Oral, Practical, Theory)	Rating	Supervisor's Signature
1.				
2.				
3.				
4.				

