

BRANCH II - M.Ch. NEUROSURGERY

There will be two streams:

6 years Course for post-MBBS candidates (General Surgery 1 year
+
Neurosurgery 5 years)

3 years Course for post-MS (General Surgery) candidates

There will be **three parts for the 6 years course**:

Part I: General Surgery at the end of the first year

Part II: Basic Neurosciences and Clinical Neurology at the end of the
third
year

Part III: Neurosurgery at the end of the sixth year

There will be **two parts for the 3 years course**:

Part - I exempted

Part II: Basic Neurosciences and Clinical Neurology at the end of the
second year

Part III: Neurosurgery at the end of the third year.

The Part II of 6 years course and of 3 years course will have the same
syllabus and pattern of examination.

The Part III of 6 years course and of 3 years course will have the same
syllabus and pattern of examination.

PART I (6 years course):

The first year will be spent in the General Surgery department and

the student will undergo training in the basic principles of surgery in general. There will be examination in the Basic Sciences in relation to General Surgery (Paper I) and the General Surgery proper (Paper II) and clinical and viva voce examinations in General Surgery.

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PART II (6 years course) & (3 years course):

NEUROANATOMY: Knowledge of Basic Neuroanatomy will include development of the nervous system including genetics malformation of the nervous system. Conventional descriptive anatomy, systemic anatomy, regional anatomy, cross sectional anatomy (relevant to X-ray Tomography C.T. Scan, Magnetic Resonance Imaging etc.) and also three dimensions anatomy of various operative approaches to the Central Nervous System, including microsurgical anatomy will form the content of the Neuroanatomy .

NEUROPHYSIOLOGY: The neurophysiology will include a detailed knowledge of Physiology of the nervous system including cerebral blood flow and CBF dynamics, electrophysiology (EEG, Nerve Conduction studies, EMG, Evoked Potentials) including all the recent advances such as Brain Mapping and Multi-modality Evoked Potentials such as BAER = (Brainstem) SSEP, VEP Cranial and peripheral nerve stimulation – Preoperatively and intraoperatively. A minimum working knowledge of handling the instrumentation and interpretation of different results will be insisted upon.

NEUROCHEMISTRY: The neurochemistry will include a detailed General Principles of Neurochemistry with special reference to normal tissue constituents, neurotransmitters, neuroreceptology and neurooncology, neurochemical aspects of neurological and neurosurgical illnesses, biochemistry of tumour of the central nervous system including tumour markers, neurochemical aspects of head injuries and spinal cord injury. MR and MR spectroscopy etc. a minimum working knowledge of interpretation of common laboratory results will be insisted upon.

NEUROPATHOLOGY: The neuropathology will include General Pathology of nerve cells, neuroglia, blood vessels, cranial and peripheral nerves and their mechanisms, patho-physiology of birth injuries, concussion, contusion, intracranial haematoma, haemorrhages, cerebral oedema, intracranial hypertension. Vascular injuries infective complications, sequels of head injuries etc. Pathology of infections, disease of the nervous system with special reference to Postmeningitic sequelae, vascular, nutritional and metabolic toxic disorders of the nervous system. Aneurysms and angiomatous (arteriovenous) malformations, pathology of brain and spinal cord tumours and peripheral nerve tumours including tumours of pituitary,

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pineal gland and spinal column in detail with special reference to histogenesis, gross pathology, micropathologic aspects, microscopic appearances, tissue culture, special diagnostic procedures including cytology techniques and immunohistochemistry. Immunology of brain tumours including current concepts in monoclonal antibodies and targeting for diagnosis and therapy.

The pathology content will include also minimum bacteriology, minimum microbiology, including virology and parasitology with special reference to agents that effects the nervous system in our area/country.

NEUROPHARMACOLOGY: The candidate should have a detailed pharmaceutical knowledge of the various aspects of the drugs and pharmaceuticals commonly used in disinfectants, antibiotics, anticonvulsants, anti-oedema measures such as diuretics, antidepressants, analgesics, antipyretics, and antiparkinson, chemotherapy drugs, antipsychiatrics, cardio-vasoactive respiratory supportive drugs, including drug assay, monitoring drug interaction protocols of clinical trials etc.

CLINICAL NEUROLOGY:

The candidate should have a detailed working knowledge of clinical examination of the neurological/neurosurgical patient including neonates and infants and unconscious patients. A thorough knowledge of the Physical signs including their neuroanatomical and neurophysiological basis, brief historical vignettes, methods of elicitation, interpretation and inference including fallacies, knowledge of various coma scales and their relative merits and deficits, a detailed knowledge of the evaluation of the Physical signs during various developmental stages, details regarding Brain Death (Cerebral death and brainstem death) etc. are all essential.

A detailed knowledge of the differentiation of some common medical neurological disorders which can closely mimic neurosurgical conditions is essential e.g., Microcephaly Vs. Craniosynostosis, Cervical spondylosis Vs. Anterior Horn Cells Disease, Medical Dementia Vs. Normal Pressure Hydrocephalus, etc.

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A working knowledge of the various medical neurological disorders, particularly more prevalent in our region, is also required. A minimum working knowledge of neurodegenerative disorders, neuro-muscular disease, genetic diseases, paroxysmal disorders etc. is a must.

A detailed working knowledge of the various diagnostic procedures including a historical vignette, the instrumentation/equipment, methodology, documentation and interpretation of results will be required. A thorough knowledge of choice of the investigative procedure in a given patient - Decision making in Neurodiagnostics -- is also essential. The candidate should have a reasonable understanding of the stroke, complications fallacies, cost-effectiveness etc. of the various neurodiagnostic procedures. The neurodiagnostic procedures in this context would include access to various parts of the CNS including

ventricles, subarachnoid space, neurovasculature, neural parenchyma etc. in the course of Neuro–ophthalmological neuro–etiological workup, Lumbar Puncture. Ventricular Puncture. Cisternal Tap, EEG, Nerve conduction studies, EMG, electrocorticography, Neuroradiology including plain x-rays, Angiography including venography, Myelography, cisternography, Interventional Radiology, Ultrasonography (neonates, infants, transcranial intraoperative and interventional), C.T. scanning, MR Imaging including MR angiography and cisternography etc. The candidate should have adequate hand–on experience with the various investigative procedures of day–today use.

The syllabus listed above (Part II) will be completed in two year i.e. during the II and III year of the 6 year course and the first two years of the 3 year course. There will be two months posting in the Neurology Unit during this period.

The examination will be at the end of three years for 6 year course and two years for the 3 year course. There will be three theory papers: Neuroanatomy and Neurophysiology (Paper I), Neurochemistry and Neuropathology (Paper II) and Clinical Neurology (Paper III) and Clinical and Viva voce examinations in Clinical Neurology.

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PART III (6 year course) and (3 year course):

There will be no set syllabus for this part. The candidate appearing for this part is expected to have a thorough knowledge of the:

- (a) main historical landmarks
- (b) neurodiagnostics including Clinical Neurology

(c) theoretical aspects, practical ward procedures, special investigatory methods, clinical features, diagnosis and differential diagnosis, preoperative and postoperative assessment and care and details of operative techniques of all the surgical diseases of the nervous system and

(d) recent advances and basic research methods in neurosurgery and the use of all the special surgical tools including Operating Microscope, LASER, CUSA, Neuroendoscopy, Radiosurgery, Intervention Neuroradiology, Stereotaxic surgery, etc.

A broad acquaintance of the classical monographs in Neurosurgery and recent neurosurgical literature will be expected. The candidate is expected to attain a high degree of clinical judgement, operative skill and efficiency in postoperative management and to conduct diagnostic and operative procedures independently.

The examiners shall also bear in mind in the evaluation of the results of the Part-III examination whether the candidate is of such high merit as to be able to teach and train other neurosurgeons in course of time and whether his skill, knowledge, clinical acumen and surgical judgement is of such high order that decisions and management regarding neurosurgically ill patients can be entrusted safely to him.

The candidates will have two months' posting in other Neurosurgical centres during their final year of the course and **two weeks in Radiodiagnosis and two weeks in Radiotherapy departments.**

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Log books showing the details of Neurosurgical and special diagnostic procedures assisted and performed, Clinical discussions, Journal club presentations, attendance in conferences and workshops, paper presentations, publications, etc. and periodically signed by the Unit

Chiefs and Head of the Department should be produced at the time of Clinical and Oral Examination.

The 6 year course students should have presented at least 3 scientific papers in national or international conferences and published at least 2 papers in the peer reviewed journals. The 3 year course students should have presented at least 2 scientific papers in national or international conferences and published at least one paper in the peer reviewed journals.

Both the 6 year and 3 year course students shall submit thesis/dissertation 6 months before the final examination. The topic of the thesis/dissertation shall be intimated to the University in the second year of 6 year course and the first year of 3 year course.

There will be two theory papers: Paper I in Neuroradiology and Clinical Neurosurgery and Paper II in Operative Neurosurgery and Recent Advances. There will be Clinical examination in Neurosurgery, ward rounds, and viva voce in Neuroradiology and Neurosurgery.

PATTERN OF THE EXAMINATION:

M.Ch. (Neurosurgery) Six years course (for post-MBBS candidates):

Part I : General Surgery : At the end of I year.

Theory :

Paper I : Basic Sciences in relation to General Surgery

Paper II : General Surgery

Clinical and Oral Examinations in General Surgery.

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Part II :Neurobasic Sciences and Clinical Neurology:At the end of III year.

Theory :

Paper I : Neuroanatomy and Neurophysiology

PaperII: Neurochemistry and Neuropathology (including
Neuropharmacology and Immunology)

Paper III : Clinical Neurology

Clinical and Oral Examinations in Clinical Neurology.

Part III : Neurosurgery : At the end of VI year

Theory :

Paper I : Neuroradiology and Clinical Neurosurgery

Paper II : Operative Neurosurgery and Recent Advances

Clinical Examination and Ward Round in Neurosurgery

Oral Examinations in Neuroradiology and Neurosurgery

Evaluation of Log Book and Dissertation/Thesis

M.Ch. (Neurosurgery) Three years course (for post-MS candidates):

There will be no Part I examination.

Part II : Neurobasic Sciences and Clinical Neurology : At the end of II year.

Theory :

Paper I : Neuroanatomy and Neurophysiology

Paper II : Neurochemistry and Neuropathology (including
Neuropharmacology and Immunology)

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Paper III : Clinical Neurology

Clinical and Oral Examinations in Clinical Neurology.

Part III : Neurosurgery : At the end of III year

Theory :

Paper I : Neuroradiology and Clinical Neurosurgery

Paper II : Operative Neurosurgery and Recent Advances

Clinical Examination and Ward Rounds in Neurosurgery

Oral Examinations in Neuroradiology and Neurosurgery

Evaluation of Log Book and Dissertation/Thesis

The Syllabus and Examination pattern will be the same for Part II and Part III for both Six years and Three years course. (There will be no Part I for Three years course).

Mark Scheme :

PART I (6 year course) : At the end of the first year

(Three years Post MS course candidates are exempted from taking Part - I Examination).

		Maximum Marks	Minimum Marks for Pass
Paper I : Theory	Basic Sciences in relation to General Surgery	100	50
Paper II: Theory	General Surgery	100	50
Clinical Examination	General Surgery	100	50
Oral Examination	General Surgery	100	50

PART II (6 year course) and (3 year course) :

At the end of 3rd year in 6 year course and at the end of 2nd year in 3 year course.

		Maximum Marks	Minimum Marks for pass
Paper I : Theory	Neuroanatomy and Neurophysiology	100	50
PaperII: Theory	Neurochemistry and Neuropathology	100	50
Paper III: Theory	Clinical Neurology	100	50

Clinical Examination	Clinical Neurology	100	50
Oral Examination	Clinical Neurology	100	50

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PART III (6 year course) and (3 year course) :

At the end of 6th year in 6 year course and at the end of 3rd year in 3 year course.

Theory :

		Maximum Marks	Minimum Marks for Pass
Paper I : Theory	Neuroradiology and Clinical Neurosurgery	100	50
Paper II: Theory	Operative Neurosurgery and Recent Advances	100	50
Clinical Examination and Ward Rounds	Neurosurgery	100	50
Oral Examination	Neuroradiology and Neurosurgery	100	50

Evaluation of Log Book and Dissertation/Thesis.