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AMALA INSTITUTE OF MEDICAL SCIENCES, THRISSUR

SYLLABUS FOR PG SUPER SPECIALITY PROGRAMME

DOCTORATE OF NATIONAL BOARD(DrNB)

Curriculum

DrNB Super Specialty

Neurology

- Aim
- Goals and Objectives of the Programme
- Teaching and Training Activities
- Syllabus
- Log Book
- Recommended Text Books and Journals

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I. AIM

The aim of the course is to develop human resources and personnel in the field of Neurology who shall

- Provide the health care to the patients needing Neurology care
- Teach and train future undergraduate and postgraduate medical students and junior doctors in Neurology in Medical Colleges, Institutions and other Hospitals.
- Carry out and guide research to improve the practice of the art and science of Neurology
- Have management capabilities to manage personnel and budgets etc. to make health care more cost-effective.
- Organise health teams to provide care during natural or man-made calamities

II. GOALS AND OBJECTIVES OF THE PROGRAMME:

1. PROGRAMME GOAL

At the end of the Postgraduate training in the discipline concerned the student shall be able to

- Recognise the importance of Neurology in the context of the health needs of the community and national priorities in the health sector.
- Practice Neurology ethically as per the Hippocratic oath and in step with the principles of primary health care, International GCP guidelines (Good Clinical Practice) .
- Demonstrate sufficient understanding of the basic sciences relevant to Neurology.
- Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive, and promotive measures/strategies.
- Diagnose and manage majority of conditions in the specialty of Neurology on the basis of clinical assessment, and appropriately selected and conducted investigations.
- Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty of Neurology.

- Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
- Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectation.
- Play the assigned role in the implementation of National Health Programmes, effectively and responsibly.
- Organise and supervise the Neurological Health Care services demonstrating adequate managerial skills in the clinic/hospital in the field situation.
- Develop skills as a self-directed learner, recognise continuing educational needs: select and use appropriate learning resources.
- Demonstrate competence in basic concepts of research methodology and epidemiology and be able to critically analyse relevant published research literature.
- Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
- Function as an effective leader of a health team engaged in health care, research or training.

2. PROGRAMME OBJECTIVES

The major objectives of Post-Graduate Curriculum are

- Theoretical Knowledge
- Practical and Clinical skills
- Attitudes including Communication skills
- Knowledge about research methodology

At the end of the DrNB Neurology course, students shall be able to

- Practice the art and science of Neurology in his/her field of practice and seek and provide consultation as required. He will have knowledge, skill and attitude to provide comprehensive neurology care.
- Conduct researches and communicate the findings, results and conclusion to his fraternity.

- Acquire necessary skills of teaching and training his junior colleagues and medical students.
- Keep abreast with the latest developments by self-learning and /or participating in Continuing Medical Education programmes.
- Organize and manage administrative responsibilities for routine day to day work as well as new situations including natural and/or man-made accidents/calamities etc. and be able to manage situations calling for emergency interventions in the sphere of neurology care and also routine problems in their areas.
- Exhibit awareness of the importance of audit and the need for considering cost effectively in patient management. Deliver preventive and rehabilitative care

KNOWLEDGE:

At the end of the course, upon successful completion of training and passing the examination the student is expected to

- Acquire comprehensive knowledge of the basics of Neurology including all allied specialities related to Neurology like Neuroanatomy, Neurophysiology, Neurochemistry, Neuropharmacology, Neuroimaging, Neuropathology, Neuroinfections, Neuroimmunology, Preventive Neurology, Neuroepidemiology, Paediatric Neurology and Neurosurgery.
- Possess a complete knowledge of all the commonly used Neurophysiological diagnostic Tests like Electroencephalography, Electromyography, evoked Potentials.
- Possess knowledge of the recent advances in the subject of Neurology and all its allied specialities and working knowledge of the sophisticated and routine equipments, consumables used in Neurology especially with respect to Neurochemistry, Neurogenetic and molecular diagnostic techniques.
- Possess knowledge of principles of research work in the field of Neurology in both the Clinical and experimental field with the ability to analyse data.
- Acquire knowledge in the performance and interpretation of special investigations such as Polysomnography, Video EEG, autonomic function tests, Transcranial Doppler tests.
- Acquire knowledge in interpretation of common neuroimaging investigations such as CT scanning, MRI scanning, MR and Digital subtraction angiography, MR spectroscopy and Single Photon Emission Computerised Tomography).

ATTITUDE AND VALUES

- Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal skills and behavior in accordance with the societal norms and expectation.

SKILLS

- Diagnose and manage majority of conditions in the specialty of Neurology on the basis of clinical assessment, and appropriate investigations.
- Possess complete Clinical Diagnostic Skills for the recognition of common Nervous system diseases.
- Acquire skills in the performance and interpretation of special investigations such as Polysomnography, Video EEG monitoring, EEG- Telemetry, autonomic function tests, Transcranial Doppler tests.
- Acquire skills in invasive procedures such as lumbar puncture, intrathecal drug administration, CSF manometry; assisting in digital subtraction angiography and intraarterial thrombolysis; and Nerve and muscle biopsy and their interpretation of relevant histopathology.
- Acquire exposure in sophisticated neuromodulation procedures such as planning of deep brain stmulation, vagal nerve stimulation.
- Able to apply sound clinical judgement and rational cost effective investigations for the diagnosis and management of Neurology Cases in the OPD, Wards, Emergency Room and Intensive Care unit.
- Be able to teach undergraduate students MBBS and Post Graduate Students MD Med or Pediatrics or Psychiatry as well as investigative Neurology.
- Be able to perform Clinical and Investigative studies and to present in Seminars, meetings and conferences etc.
- Have the ability to organise specific teaching and training programmes for para medical staff, associated professionals and patient education programmes.
- Should be able to develop good communication skills and give consultations to all other departments of the hospital.
- Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
- Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectation.

- Develop skills as a self-directed learner, recognise continuing educational needs: select and use appropriate learning resources.
- Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.

III. TEACHING AND TRAINING ACTIVITIES

The fundamental components of the teaching programme should include:

1. Case presentations & discussion- once a week
2. Seminar – Once a week
3. Journal club- Once a week
4. Grand round presentation (by rotation departments and subspecialties)- once a week
5. Faculty lecture teaching- once a month
6. Clinical Audit-Once a Month
7. A poster and have one oral presentation at least once during their training period in a recognized conference.

The rounds should include bedside sessions, file rounds & documentation of case history and examination, progress notes, round discussions, investigations and management plan) interesting and difficult case unit discussions.

The training program would focus on knowledge, skills and attitudes (behavior), all essential components of education. It is being divided into theoretical, clinical and practical in all aspects of the delivery of the rehabilitative care, including methodology of research and teaching.

1. **Theoretical:** The theoretical knowledge would be imparted to the candidates through discussions, journal clubs, symposia and seminars. The students are exposed to recent advances through discussions in journal clubs. These are considered necessary in view of an inadequate exposure to the subject in the undergraduate curriculum.

2. **Symposia:** Trainees would be required to present a minimum of 20 topics based on the curriculum in a period of three years to the combined class of teachers and students. A free discussion would be encouraged in these symposia. The topics of the symposia would be given to the trainees with the dates for presentation.

3. **Clinical:** The trainee would be attached to a faculty member to be able to pick up methods of history taking, examination, prescription writing and management in rehabilitation practice.

4. **Bedside:** The trainee would work up cases, learn management of cases by discussion with faculty of the department.

5. **Journal Clubs:** This would be a weekly academic exercise. A list of suggested Journals is given towards the end of this document. The candidate would summarize and discuss the scientific article critically. A faculty member will suggest the article and moderate the discussion, with participation by other faculty members and resident doctors. The contributions made by the article in furtherance of the scientific knowledge and limitations, if any, will be highlighted.

6. **Research:** The student would carry out the research project and write a thesis/ dissertation in accordance with NBE guidelines. He/ she would also be given exposure to partake in the research projects going on in the departments to learn their planning, methodology and execution so as to learn various aspects of research.

IV. SYLLABUS

1. The Clinical Method of Neurology
2. Cardinal Manifestations of Neurologic Disease
3. Growth and Development of the Nervous System
4. The Neurology of Aging

a. BASIC SCIENCES RELATED TO NEUROLOGY

i. NEUROANATOMY

The Neuroanatomy with special emphasis on development of Neuraxis (brain, spinal cord and neurons and glia), autonomic nervous system and their maturation process in the post natal, childhood and adolescent states; the location and significance of stem cells, CSF pathways, Blood supply and sinovenous drainage of brain and spinal cord, the meninges, skull and vertebral

column, the cranial nerves, spinal roots, plexuses, and their relation to neighbouring structures; anatomy of peripheral nerves, neuromuscular junction and muscles; histology of cerebrum, cerebellum, pituitary gland, brain stem and spinal cord, nerves and neuromuscular junction and muscle. Functional anatomy of lobes of cerebrum and white matter tracts of brain and spinal cord, craniovertebral junction, conus and epiconus and cauda equina, brachial and lumbosacral plexuses, cavernous and other venous sinuses; New developments in understanding of ultrastructural anatomy of neurons, axonal transport, neural networks and synapses and nerve cell function at molecular level.

ii. NEUROPHYSIOLOGY

Neurophysiology will cover all the physiological changes in the nervous system during its normal function with special reference to nerve impulse transmission along myelinated fibres, neuromuscular junction and synaptic transmission, muscle contraction; visual, auditory and somatosensory and cognitive evoked potentials; regulation of secretions by glands, neural control of viscera such asheart, respiration, GI tract, bladder and sexual function; sleep-wake cycles; maintenance of consciousness, special senses, control of pituitary functions, control of autonomic functions, cerebellar functions, extrapyramidal functions, reflexes, upper and lower motor neuron concepts and sensory system.

iii. MOLECULAR BIOLOGY

Brain is the one structure where maximum genes are expressed in the human body. Principles of molecular biology including Gene Structure, Expression and regulation; Recombinant DNA Technology; PCR Techniques, Molecular basis for neuronal and glial function, Molecular and cellular bilology of the membranes and ion-channels, mitochondrial genome, role of RNA in normal neuronal groth and functional expression, receptors of neurotransmitters, molecular and cellular biology of muscles and neuromuscular junction, etc, The Human Genome and its future implications for Neurology including developmental and neurogenetic disorders, bioethical implications and genetic counselling, Nerve growth and other trophic factors and neuroprotectors, Neural Tissue modification by genetic approaches including Gene Transfer, stem cell therapy etc, Molecular Development of neural tissue in peripheral nerve repair are exciting areas where stuentsned to have basic exposure.

iv. NEUROCHEMISTRY

All aspects of normal and abnormal patterns of neurochemistry including neurotransmitters associated with different anatomical and functional areas of brain and spinal cord, especially with respect to dopaminergic, serotoninergic, adrenergic and cholinergic systems, opioids, excitatory and inhibitory aminoacids; their role in pathogenesis of parkinsonism, depression, migraine, dementia, 8 epilepsy; neuromuscular junction and muscle contractions; carbohydrate, aminoacid and lipid metabolism and the neural expression of disorders of their metabolism, electrolytes and their effect on encephalopathies and muscle membrane function, storage disorders, porphyrias

v. NEUROPHARMACOLOGY

Application of neuropharmacology is the mainstay of all medical therapy of epilepsy, Parkinsonism, movement disorders, neuropsychiatric syndromes, spasticity, pain syndromes, and disorders of sleep and dysautonomic syndromes. Their drug interactions with commonly used other drugs, usage during disorders of renal, hepatic function and in the demented, their adverse reactions etc.

vi. NEUROPATHOLOGY

All pathological changes in various neurological diseases with special reference vascular, immune mediated, de/dysmyelinating, metabolic and nutritional, genetic and developmental, infectious and iatrogenic and neoplastic aetiologies to clinical correlation included. Special emphasis on pathological changes in nerve and muscle in neuropathies and myopathies. Ultrastructural pathologies such as apoptosis, ubiquitinopathies, mitochondrioses, channelopathies, peroxisomal disorders, inclusion bodies, prion diseases, disorders mediated by antibodies against various cell and nuclear components, paraneoplastic disorders etc.

vii. NEUROMICROBIOLOGY

The various microbiological aspects of infectious neurologic diseases including encephalitis, meningitis, brain abscess, granulomas, myelitis, cold abscess, cerebral malaria, parasitic cysts of nervous system, rhinocerebral mycoses, leprous neuritis, neuroleptospirosis, Primary and secondary Neuro HIV infections, congenital TORCH infections of brain, slow virus infections such as JCD and SSPE, neurological complications of viral infections such as Polio, EBV, Chickenpox, Rabies, Herpez, Japanese encephalitis and other epidemic viral infections.

viii. NEUROTOXICOLOGY

Organophosphorus poisoning, hydrocarbon poisoning, lead, arsenic, botulinumtoxin and tetanus toxicity, snake, scorpion, spider , wasp and bee stings are important tropical neurotoxic syndromes whose prompt diagnosis and effective therapy are crucial in life saving

ix. NEUROGENETICS AND PROTEOMICS:

Autosomal dominant and recessive and Xlinked inheritance patterns, disorders of chromosomal anomalies, Gene mutations, trinucleotide repeats, dysregulation of gene expressions, enzyme deficiency syndromes, storage disorders, disorders of polygenic inheritance, and proteomics in health and disease

x. NEUROEPIDEMIOLOGY:

Basic methodologies in community and hospital based neuroepidemiological studies such as systematic data collection, analysis, derivation of logical conclusions, concepts of case-control and cohort studies, correlations, regressions and survival analysis; basic principles of clinical trials. 9 snake envenomation

b. CLINICAL NEUROLOGY INCLUDING PEDIATRIC NEUROLOGY AND NEURO PSYCHIATRY.

i. GENERAL EVALUATION OF THE PATIENT

The science and art of history taking, Physical Examination including elements of accurate history taking, symptoms associated with neurological disease, The physical examination of adults, children, infants and neonates, syndromes associated with congenital and acquired neurological disease, cutaneousmarkers, examination of unconscious patients, examination of higher mental functions, cranial nerves, the ocular fundus, examination of tone, power of muscles, proper elicitation of superficial and deep reflexes including the alternate techniques and neonatal and released reflexes, neurodevelopmental assessment of children, sensory system, peripheral nerves, signs of Meningeal irritation, skull and spine examination including measurement of head circumference, shortness of neck and carotid pulsations .and vertebral bruits.

- COMA

Pathophysiology and diagnosis of COMA, Diagnosis and management of coma, delirium and acute confusional states, reversible and irreversible causes, persistent vegetative states and brain death, neurophysiological evaluation and confirmation of these states and mechanical ventilation and other supportive measures of comatose patient and prevention of complications of prolonged coma. The significance of timely brain death in organ donation and ICU resource utilization

- SEI ZURES AND EPILEPSY and SYNCOPES
  Diagnosis of seizures, epilepsy and epileptic syndromes, Recognition, clinical assessment and management of seizures especially their electro diagnosis, video monitoring with emphasize on phenomenology and their correlation with EEG and structural and functional brain imaging such as CT and MRI and fMRI and SPECT scan, Special situations such as epilepsy in pregnant and nursing mothers, driving, risky occupations, its social stigmas differentiation from pseudoseizures, use of conventional and newer antiepileptic drugs, their drug interactions and adverse effects etc., modern lines of management of intractable epilepsies, such as ketogenic diet, vagal nerve stimulation, epilepsy surgery and about presurgical evaluation of patients. Management of status epilepticus and refractory status epilepticus; Differentiation of seizures from syncopes, drop attacks, cataplexy, startles etc.

- HEADACHES AND OTHER CRANIAL NEURALGIAS
  Acquisition of skills in analysis of headaches of various causes such as those from raised intracranial pressures, migraines, cranial neuralgias, vascular malformations, Meningeal irritation, psychogenic etc.and their proper pharmacologic management.

ii. CEREBROVASCULAR DISEASES
Vascular anatomy of brain and spinal cord, various causes and types of cerebrovascular syndromes, ischemic and hemorrhagic types, arterial and venous types, anterior and posterior circulation strokes, OCSP and TOAST classifications, investigations of strokes including neuroimaging using dopplers, CT and MR imaging and angiography, acute stroke therapy including thrombolytic therapy, interventional therapy of cerebrovascular diseases, principles of management of subarachnoid hemorrhage etc. Special situations

like strokes in the young, Strategies for primary and secondary prevention of stroke

iii. DEMENTIAS

Concept of minimal cognitive impairment, Reversible and irreversible dementias, causes such as Alzheimer's and other neurodegenerative diseases and vascular and nutritional and infectious dementias, their impact on individual, family and in society, Genetic and familial syndromes. Pharmacotherapy of dementias, Potential roles of cognitive rehabilitation and special care of the disabled

iv. PARKINSONISM AND MOVEMENT DISORDERS

Disorders of extrapyramidal system such as parkinsonism, chorea, dystonias, athetosis, tics, their diagnosis and management, pharmacotherapy of parkinsonism and its complications, management of complications of parkinsonism therapy, including priciples of deep brain stimulation and lesionalsurgeries. Use of EMG guided botulinum toxin therapy, management of spasticity using intrathecal baclofen and TENS.

v. ATAXIC SYNDROMES:

Para infectious demyelinations, cerebellar tumors, hereditary ataxias, vestibular disorders; Diagnosis and management of brainstem disorders, axial and extra-axial differentiation. `

vi. CRANIAL NEUROPATHIES:

Disorders of smell, vision, visual pathways, pupllarypatheays and reflexes, internuclear and supranuclearophthalmoplegia;other oculomotor disorders, trigeminal nerve testing, Bell's palsy, differentiation from UMN facial lesions, brainstem reflexes, Investigations of vertigo and dizziness, differentiation between central and peripheral vertigo, Differential diagnosis of nystagmus , investigations of deafness, bulbar and pseudobulbar syndromes,

vii. CNS INFECTIONS:

Diagnosis and management of viral encephalitis, meningitis :bacterial, tuberculous, fungal, parasitic infections such as cysticercosis, cerebral malaria, SSPE, Neuro HIV primary and secondary infections with exposure to gram stain and cultures, bac tec, QBC, ELISA and PCR technologies

viii. NEUROIMMUNOLOGIC DISEASES

Diagnosis and management of CNS conditions such as Multiple sclerosis, PNS conditions such as GBS, CIDP, Myasthenia gravis, polymyositis

ix. NEUROGENETIC DISORDERS

Various chromosomal diseases, single gene mutations such as enzyme deficienies, autsomal dominant and recessive conditions and X-linked disorders, trinucleotide repeats, disorders of DNA repair. Genetics of Huntington's disease, familial dementias, other storage disorders, heriditary ataxias, hereditary spastic paraplegias, HMSN, muscular dystrophies, mitochondrial inheritance disorders

x. DEVELOPMENTAL DISORDERS OF NERVOUS SYSTEM

Neuronal migration disorders, craniovertebral junction diseases, spinal dysraphisms, phacomatoses and other neurocutaneous syndromes- their recognition and management.

xi. MYELOPATHIES

Clinical diagnosis of distinction between compressive and non-compressive myelopathies, spinal syndromes such as anterior cord, subacute combined degeneration, central cord syndrome, Brown-sequard syndrome, tabetic syndrome, Ellsberg phenomenon. Diagnosis of spinal cord and root compression syndromes, CV junction lesions, syringomyelia, conuscauda lesions, spinal AVMs, tropical and heriditary spastic paraplegias, Fluorosis.

xii. PERIPHERAL NEUROPATHIES

Immune mediated, heriditary, toxic, nutritional and infectious type peripheral neuropathies; their clinical and electrophysiological diagnosis

xiii. MYOPATHIES AND NEUROMUSCULAR JUNCTION DISORDERS

Clinical evaluation of patients with known or suspected muscle diseases aided by EMG, muscle pathology, histochemistry, immunopathology and genetic studies. Dystrophies, polymyositis, channnelopathies, congenital and mitochondrial myopathies.. Neuromuscular junction disorders such as myasthenia, botulism, Eaton-lambert syndrome and snake eandorgganphosphorus poisoning, their eletrophysiological diagnosis and management. Myotonia, stiff person syndrome.

xiv. PAEDITRIC NEUROLOGY:

Normal development of motor and mental milestones in a child, Cerebral palsy, Attention deficit disorder, Autism, developmental dyslexias, Intrauterine TORCH infections, Storage disorders, Inborn errors of metabolism affecting nervous system, developmental malformations, Child hood seizures and epilepsies, neurodegenerative diseases.

xv. COGNITIVE NEUROLOGY AND NEUROPSYCHIATRY:

Detailed techniques of higher mental functions evaluation, basics of primary and secondary neuropsychiatric conditions such as anxiety, depression, schizophrenia, acute psychosis, acute confusional reactions (delirium), organic brain syndrome, primary and secondary dementias, differentiation from psudodementia, Anxiety disorders, Hysteria and personality disorders, depression and Bipolar disease,Schizopherenia Delusional and paranoid state

xvi. TROPICAL NEUROLOGY

Conditions which are specifically found in the tropics like neuro cysticercosis, cerebralo malaria, tropical spastic paraplegia, Snake/scorpion/ Chandipura encephalitis, Madras Motor Neuron disease etc. will be dealt with in special detail in the curriculum

c. DIAGNOSTIC AND INTERVENTIONAL NEUROLOGY INCLUDING NEUROLOGICAL INSTRUMENTATION

i. DIAGNOSTIC NEUROLOG

Performing and interpreting Digital Electroneurogram, Electromyogram, Evoked potentials, Electroencephalography, Interpretation of skull and spine X rays, computerized tomography of brain and spine, Magnetic resonance images of brain including correct identification of various sequences, angiograms, MR spectroscopy, basics of functional MRI, Interpretaion of digital subtraction imaging , SPECT scans of brain, subdural EEG recording, transphenoidal electrode EEG Techniques for temporal lobe seizures, video EEG interpretation of phenomenology and EEG-phenomenology correlations, EEG tapemetry, Transcranial Doppler diagnosis and monitoring of acute ischemic stroke, subarachnoid haemorrhage, detection of right-to-left shunts etc; Colour duplex scanning in Carotid and vertebral extracranial segment screening

ii. NEUROINSTRUMENTATIONS

To acquire skills in Procedures like a)intrathecal administration of antispasticity drugs, beta interferons in demyelination, opiates in intractable pain etc., b) EMG guided Botox therapy for dystonias, c) subcutaneous administration of antimigraine and antiparkinsonian drugs d) Intrarterial thrombolysis in extended windows of thrombolysis in ischemic strokes, e) Transcranial Ultrasound clot-bust intervention in a registry in acute stroke care unit e) Planing in deep brain stimulation therapy in uncontrolled dyskinesias and on-off phenomena in long standing parkinsonism f) Planning in vagal nerve stimulation in intractable epilepsy

d. RECENT ADVANCES IN NEUROLOGY: ADVANCES IN NEUROIMAGING TECHNIQUES, BIONICS IN NEURAL PROSTHESIS AND REHABILITATION, NEUROPROTEOMICS AND NEUROGENETICS, STEM CELL AND GENE Y, GENE THERAPY

i. ADVANCES IN NEUROIMAGING TECHNIQUES:

Integration of CT, MR, SPECT images with each other and with EEG, EVOKED potentials based brain maps in structural and functional localization in neurological phenomena and diseases, Fluorescent ye tagged study of neurons in diseases in animal models in vivo and in tissue cultures in-vitro.

ii. BIONICS IN NEURAL PROSTHESIS AND REHABILITATION:

Advanced techniques in neurorehabilitation such as TENS, principles of man-machine interphase devices in cord, nerve and plexus injuries, cochlear implants, artificial vision.

iii. NEUROPROTEOMICS AND NEUROGENETICS:

Brain functions are regulated by proteomics and genomics linked to various proteins and genes relevant to the brain, body's maximum number of proteins and genes being expressed in brain as neurotransmitters or channel proteins and predisposing brain to a number of disorders of abnormal functioning of these proteins.

iv. STEM CELL AND GENE THERAPY:

Principles of ongoing experiments on stem cell therapy for nervous system disorders such as foetal brain tissue transplants in parkinsonism; intrathecal

marrow transplants in MND,MS, Spinal trauma; myoblasts infusion therapy in dystrophies

v. NEUROEPIDEMIOLOGICAL STUDIES AND CLINICAL TRIALS:

The students of the DrNB course will be trained in conducting sound neuroepidemiological studies on regionally and nationally important neurological conditions as well as on diseases of scientific and research interest to the department. They will also be trained in principles of clinical trials with exposure to research

Areas in which knowledge is to be acquired:

- Biostatistics, Research Methodology and Clinical Epidemiology
- Ethics
- Medico legal aspects relevant to the discipline
- Health Policy issues as may be applicable to the discipline

vi. TEACHING SCHEDULE:

FIRST YEAR:

a. During the first year, the student will be working fully in the Department of Neurology. In the morning time, he/she will be familiarized with clinical neurology, neurological examination, localization and differential diagnosis, relevant laboratory and radiological investigations and pharmacotherapeutics.
b. He/she will attend all the outpatient services and get himself/herself aware of the common neurological problems.
c. In addition, he/she will work in the electrophysiology laboratories and get himself/herself fully familiar with EMG, evoked potential and electroencephalography (EEG).
d. He/she should be competent to handle the equipments and report independently. In the afternoon, he/she will concentrate on the basic sciences and will undertake the research study within three months after admission in the course.

SECOND YEAR:

The student may be sent to the best centre for training and learning the following subjects. This comes under 'visit to other centres'. The total period is for five months. Following will be the subject and duration of training:-

a. Neuropathology – 30 days.
b. Neuro-radiology (including interventional radiology) – 30 days. Intensive Care in Neurology – 30 days.
c. Psychiatry – 15 days. Paediatric Neurology – 30 days. Neurosurgery – 15 days.

THIRD YEAR:

During the period, the student will work in the Neurology department concentrating on clinical and theoretical neurology, clinical psychiatric relevant investigations and medical as well as para medical management of the patients. Besides, he shall handle and report the EEG and EMG by himself/herself

V. LOG BOOK

A candidate shall maintain a log book of operations (assisted / performed) during the training period, certified by the concerned post graduate teacher / Head of the department / senior consultant.

This log book shall be made available to the board of examiners for their perusal at the time of the final examination.

The log book should show evidence that the before mentioned subjects were covered (with dates and the name of teacher(s) The candidate will maintain the record of all academic activities undertaken by him/her in log book.

1. Personal profile of the candidate
2. Educational qualification/Professional data
3. Record of case histories
4. Procedures learnt
5. Record of case Demonstration/Presentations
6. Every candidate, at the time of practical examination, will be required to produce performance record (log book) containing details of the work done by him/her during the entire period of training as per requirements of the log book. It should be duly certified by the supervisor as work done by the candidate and countersigned by the administrative Head of the Institution.
7. In the absence of production of log book, the result will not be declared.

VI. RECOMMENDED TEXT BOOKS AND JOURNALS

1. TEXT BOOKS

- DeJong's The Neurological Examination, 7th Edition. Stephanie Lessig, MD edited by William Campbell, 671 pp., illus., Philadelphia, Lippincott Williams & Wilkins,
- Localization in Clinical Neurology By Brazis, Paul W, Masdeu, Joseph C. , Biller, Jose ; 7th edition 2006.Lippincot and Williams
- Principles of Neuroscience: Kandal and Schwartz 5th edition
- Applied neuroanatomy: Carpenter, 9th Edition
- Aminoff,selectrodiagnosis in Clinical neurology: Aminoff M, 6th edition
- Evoked potentials. Chiappa.
- Molecular Neuropharmacology: Seigal. 3rd edition
- The Mental Status Exam. in Neurology. Strubabd Black 4th edition
- Examination of a comatose patient: Plum and Posner 3rd edition
- Handbook of Neurology; Vinken and Bruyn.
- Tropical Neurology. JS Chopra 2nd edition
- Tropical Neurology: NH Wadia
- Neurology in Clinical Practice. 2 volumes; 7th edition, 2016 by Bradley, Gerald M. Fenichel, Robert B. Daroff, Joseph Jankovic
- Diseases of the Nervous System: Clinical Neuroscience and Therapeutic Principles (diseases of the nervous system (Asbury). 2002
- Adams & Victor's Principles of Neurology, 10th Edition Allan H. Ropper, Martin A. Samuels
- Aminoff's Neurology and General Medicine, 5th Edition
- Epilepsy: A Comprehensive Textbook 3 Volumes; Editors 2nd edition. Jerome Engel Jr., MD, PhD, Timothy A. Pedley MD
- Epilepsy and Epileptic syndrome. Hans luder.
- • Electroencephalography. Niedermeyer. 6th Ed. 2011.
- Parkinson's disease and movement disorders. By Joseph Jankovic, Eduardo Tolosa. 5th edition
- Stanley Fahn, C. David Marsden, Donald Brian CalneEditorsStanleyFahn, C. David Marsden, Donald Brian Calne; Publisher Raven Press, 1988
- Clinical Pediatric Neurology, 7th Edition - A Signs and Symptoms Approach: Expert Consult - By Gerald Fenichel
- Padiatric Neurology. Swaiman& Wright
- Caplan's Stroke: A Clinical Approach; 5th edition by Louis Caplan

- Stroke: A practical management: by Charles Warlow, Jan Van Gijn, Joanna M. Wardlaw, Martin S. Dennis. 2008, 3rd edition
- Sleep Disorders Medicine: Basic Science, Technical Considerations, and Clinical Aspects Edited by SudhansuChokroverty. 504 pp. Boston, Butterworth-Heinemann, 1994. Edition 3, 2009.
- Continuum in Neurology. (American Academy of Neurology)
- Adams & Victor's Principles of Neurology - Allan H. Ropper, Martin A. Samuels. 10th Edition McGraw Hill, 2014.

2. JOURNALS

- Annals of Indian Academy of Neurology
- Neurology India
- Neurology
- Annals of Neurology.
- Journal of the Neurological Sciences.
- Journal of Neurology, Neurosurgery and Psychiatry.
- Brain
- Stroke
- Neurology Clinics of North America
- Current opinion in Neurology
- The Lancet
- Journal of the Association of Physicians of India.
- Journal of the Indian Medical Association.
- Bulletin of the ICMR
- Bulletin of the WHO
- Journal of the American Medical Association
- Medical Clinics of North America.
- Annals of Indian Academy of Neurology
- Neurology India
- Neurology
- Annals of Neurology.
- Journal of the Neurological Sciences.
- Journal of Neurology, Neurosurgery and Psychiatry.
- Brain
- Stroke
- Neurology Clinics of North America
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- The Lancet

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- Journal of the Indian Medical Association.
- Bulletin of the ICMR 15. Bulletin of the WHO
- Journal of the American Medical Association.
- Medical Clinics of North America.

आयुर्विज्ञान में राष्ट्रीय परीक्षा बोर्ड

स्वास्थ्य एवं परिवार कल्याण मंत्रालय, भारत सरकार

मेडिकल एन्क्लेव, अंसारी नगर, नई दिल्ली – 110029

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