CURRICULUM

DM Pediatric Neurology

(3-year course)

Department of Pediatrics

All India Institute of Medical Sciences

Nagpur

DM Pediatric Neurology Curriculum Index page

Sr. No.	Content	Page No.
1.	Goal	03
2.	Program Outcomes	03
3.	Eligibility Criteria	06
4.	Selection of the candidate	06
5.	Duration of course	06
6.	Syllabus	06
7.	Postings/Rotation	12
8.	Academic activities	15
9.	Logbook	15
10.	Dissertation	16
11.	Assessment	17
12.	Recommended Reading	21

1. GOAL

The goal of a postdoctoral degree in Pediatric Neurology (DM – Doctorate of Medicine) is to bring out competent Pediatric neurologists who shall recognize the health needs of children with neurological disorders and provide quality health care. Pediatric Neurology has evolved as a separate discipline in India as it requires a different set of clinical approaches and management skills as compared to adult Neurology. During the training period, they shall master the competencies in Pediatric Neurology and basic medicine that are required for Pediatric Neurology practice from the primary to tertiary level of the health care system. In addition, they should also acquire skills in teaching, research, organizational competency and social healthcare capabilities.

2. PROGRAMME OUTCOMES

The student should acquire the following competencies under cognitive, affective and psychomotor domains:

Sr.No.	Competencies
1. Cognitive Domain	
1.1	Understand the normal anatomy and physiology of nervous system and to Understand the basic principles involved in pathology of pediatric neurological disorders and their assessment
1.2	Be conversant with the etiology, pathophysiology, diagnosis, and management of routine and complex pediatric neurological diseases in an out -patient, inpatient and emergency settings.
1.3	Interpret laboratory data in relation to clinical findings with reasonable accuracy
1.4	Possess knowledge of radio-imaging techniques like Plain X-ray, Neurosonogram, CT and MRI
1.5	Recognize the importance of inter-disciplinary approach in the management of various pediatric neurology diseases and obtain relevant specialist / ancillary services' consultation where appropriate
1.6	Acquire and demonstrate the knowledge about nerve conduction, EMG, EEG and evoked potentials

1.7	Ability to teach pediatric neurology to undergraduates, postgraduates, nurses and paramedical staff including laboratory personnel
1.8	To carry out research on pediatric neurology-related topics and to be able to systematically write a paper and publish it in a relevant journal
1.9	Able to supervise and work with subordinates and colleagues in the department
1.10	Subject himself/herself to continuing education and constantly update his/her knowledge of recent advances in Pediatric neurology and allied subjects
2. Affective Domain *(Ethics, Attitudes and Professionalism)*	
2.1	**Communication skills** -Communication with patients/parents/guardians and relatives -Communication with members of the health care team/ multi-disciplinary team
2.2	**Professional relationships with patients and relatives** -Involvement with patients/guardians/caregivers in decision making -Understanding of cultural and religious beliefs and awareness of their impact on decision-making -Understanding of privacy, dignity, confidentiality and legal constraints on the use of patient data
2.3	**Professional relationships with members of the healthcare team** -Collaboration, consultation, teamwork -Supervision and delegation of duties and responsibilities to juniors and others
3. Psychomotor Domain	
3.1	Elicit, document, and present a detailed neurological history and other relevant histories pertaining to the nervous system
3.2	Perform and demonstrate the correct method of physical examination including detailed neurological examination in neonates, infants, and children.
3.3	Analyse the symptoms and signs and propose a provisional diagnosis or differential diagnosis
3.4	Formulate a plan for diagnostic evaluation of children with neurological disorders like epilepsy, stroke, neuromuscular disorders, movement disorder, neuro-metabolic disorders, neurodegenerative disorders, neuro-infections, and neuro-developmental disorders.

3.5	To set priorities for laboratory studies, electro-physiology, imaging, and genetic studies as required
3.6	Perform and interpret all electro-physiological procedures like electroencephalography (EEG), Nerve conduction study (NCV), electromyography (EMG), visual evoked potentials (VEP), brainstem auditory response (BERA), and repetitive nerve stimulation test (RNST), Autonomic function testing.
3.7	Perform procedures such as lumbar puncture, muscle biopsy, skin biopsy, nerve biopsy, bone marrow aspiration and biopsy.
3.8	Interpret the reports of all investigations like cerebrospinal fluid analysis, electrophysiology, polysomnography, neuroimaging (CT brain, MRI brain and spine), neuro metabolic investigations and genetic investigations and correlate its findings in a clinical context.
3.9	Formulate a plan for subsequent therapy for children with neurological disorders like neuro-infections, epilepsy, neurometabolic disorders, cerebrovascular disorders, autoimmune disorders, demyelinating disorders, and neurodegenerative disorders.
3.10	Describe a plan for evaluating and managing neonates with neurological problems including intracranial haemorrhage, neonatal seizure, neonatal meningitis, hypoxic ischemic encephalopathy, kernicterus, metabolic encephalopathies, and congenital infections
3.11	Decide the evaluation and management of neurological disorders in the pediatric intensive care unit including status epilepticus, management of raised intracranial pressure, coma, central nervous system infections, acute flaccid paralysis, and neurological complications of surgical patients and post-operative care of neurosurgical patients.
3.12	Decide the evaluation and subsequent management of neurological conditions in children when called for consultations.
3.13	Explain the principles of rehabilitation emphasizing the role of physiotherapy, occupational therapy, speech therapy and special education.
3.14	Decide the right candidate for administration of Botulinum toxin where indicated and administration of the same.
3.15	Decide the extent of disability in children with neurological disorders and be able to calculate the degree of impairment required for disability certification.

3. ELIGIBILITY CRITERIA

M.D/ D.N.B (Pediatrics) from NMC recognized college or from Institutes of National Importance.

4. SELECTION OF THE CANDIDATE

Through the INI CET Super Speciality exam

5. DURATION OF THE COURSE

The training shall be of 3 years full-time residency pattern. During these years, the candidate shall be a senior resident who will perform clinical, teaching and research activities as prescribed in the curriculum. The candidate shall be given additional administrative responsibilities during these years as per his/her competency.

6. SYLLABUS

Learning in the DM course will eventually be self-directed and will take place while working in the clinics and through interactions in the rounds. Apart from the faculty of the division of child neurology, members of the department faculty and members of other departments will also be involved in the didactic teaching of respective fields as follows.

System/Section	List of topics
(I) Development of the Infant and young child	(a) Anatomy of Neurodevelopment (b) Physiology of Neurodevelopment (c) Assessment of normal development (d) Variations of the normal development (e) Developmental surveillance of at-risk neonates and infants (f) Approach to infants and children with global developmental delay (g) Diagnosis and management of children with Cerebral Palsy (h) Screening and interventions for Autism spectrum disorders (i) Screening and interventions for Attention deficit hyper activity disorders (j) Evaluation and management of children with Learning disorders / Scholastic difficulties (k) Intellectual disability: Comprehensive evaluation and rehabilitation
(II) CNS malformations	(a) Normal embryology and anatomy of the CNS (b) Common CNS malformations (c) Medical and Surgical management of CNS malformations
(III) Seizures and Epilepsy in childhood	(a) Epileptic Seizures and non-epileptic events (b) Febrile seizures (c) Classification /evaluation and management of epilepsy

	(d) Epileptic syndromes (e) Status epilepticus (f) Intractable epilepsy (g) EEG in seizure disorders (h) Surgical management of seizure disorders (i) Non-pharmacological treatments of refractory epilepsy-ketogenic diet and vagal nerve stimulation.
(IV) Infections of the CNS	(a) Acute pyogenic meningitis (b) Neonatal meningitis (c) Chronic meningitis (d) Brain abscess (e) Acute encephalitis (f) Cerebral malaria (g) Acute febrile encephalopathy (h) Neurocysticercosis (i) HIV encephalopathy (j) SSPE (k) Congenital infections (l) Laboratory diagnosis of CNS infections
(V) Neuro Immunology	(a) Primary demyelinating diseases of the CNS (b) ADEM, optic neuritis, acute transverse myelitis, neuromyelitis optics, multiple sclerosis (c) Immunologically mediated diseases affecting the CNS Gray matter, peripheral nervous system (d) Autoimmune encephalitis (e) Opsoclonu smyoclonusataxia syndrome (f) Systemic vasculitides with nervous system manifestations
(VI) Neurodegenerative disorders	(a)Classification, Approach to a patient – grey matter, white matter cerebellar and basal ganglia disorders (b) Diagnosis (including histopathology and neurogenetics) (c) Management (d) Antenatal/ Genetic counselling (e) Recent advances in therapies

(VII) Neurometabolic disorders including mitochondrial disorders	(a) Classification, evaluation and approach to a patient (b) Diagnostic evaluation (Biochemical, molecular and histological) (c) Neurogenetics (d) Dietary management of Metabolic disorder (e) Long-term management, follow-up and prenatal counseling
(VIII) Genetics	(a) Autosomal abnormalities (b) Sex chromosomal abnormalities (c) Chromosomal abnormalities in various dysmorphic syndromes (d) Patterns of Inheritance (e) Uses and interpretation of various genetic tests in the diagnosis of neuro genetic disorders (Karyotyping, FISH, MLPA, Chromosomal microarray, clinical exome sequencing, whole exome sequencing, Whole genome sequencing and Sanger sequencing)
(IX) Toxic and nutritional disorders	(a)Toxic disorders: lead, thallium, arsenic, mercury, aluminium, organic toxins (b)Nutritional disorders; protein-energy malnutrition, Vitamin deficiencies, infantile tremor syndrome
(X)Neurocutaneous syndromes	(a) Spectrum of neuro cutaneous syndromes (b) Neuro fibromatosis (c)Tuberous Sclerosis Complex (d) SturgeWeber Syndrome etc. (e) Hypomelanosis of Ito and Incontinentia pigmenti (f)Other neuro cutaneous syndromes
(XI) Movement disorders	(a)Approach to child with movement disorder (b) Chorea: Approach and management (c) Dystonia: Approach and management (d) Tic disorders: Evaluation and treatment (e)Approach to child with Ataxia
(XII) Cerebrovascular disorders	(a) Arterial thrombosis (b) Venous thrombosis/embolism (c) Intracranial bleed (d) Stroke

	(e) Role of Radioimaging (f) Arterial ischemic stroke(AIS) (g) Hemorrhagic stroke (h) Perinatal stroke (Presumed perinatal and Neonatal stroke)
(XIII) Neonatal neurology	(a)Neurological assessment of neonate (b) Neonatal encephalopathy: Approach (c)Neonatal seizures (d) Hypoxic encephalopathy (e) Intraventricular Hemorrhage and hydrocephalus (f) Clinical neurological assessment (g) Role of EEG, Ultrasonography, CT scan (h) Meningitis and Ventriculitis (i) Approach to neonate with suspected IEM (j) Floppy neonate: Evaluation and management (k) Neonatal euromuscular disorders (l) CNS malformations
(XIV) Brain tumours	(a) Features, Classification, Evaluation and management (b) Role of Radiotherapy
(XV) Spinal cord disorders	(a)Approach and localization of spinal cord disorders. (b) Spinal dysraphism (Types, evaluation and management) (c)Vascular, Nutritional and Inflammatory disorders of spinal cord (d) Neurogenic bladder: Evaluation and management
(XVI) Neuromuscular disorders	(a) Evaluation and investigation (b) Histopathological changes in different disorders (c) Developmental disorders of muscle (d) Muscular dystrophies (e) Endocrine and metabolic myopathies (f) Inflammatory myopathies (g) Disorders of Neuromuscular transmission (h) Spinal muscle atrophy (i) Motor neuron disease (j) Autonomic neuropathies (k) Guillain Barre syndrome (l) Advances in treatment of neuro muscular disorders

	(m)Brachial plexus injuries: Diagnosis and management (n)Hereditary neuropathies (o)Approach ot floppy infant and floppy child
(XVII) Intellectual Disability	(a) Assessment of intelligence quotient (b) Causes, Evaluation (c) Prevention / Role of antenatal counselling
(XVIII) Behavioral and Pervasive disorders (in coordination with the Departments of Psychiatry and with NGOs in the schools and field)	(a) Attention Deficit Hyperactivity disorder (ADHD), Autistic spectrum Disorder (b) Learning disability
(XIX) Coma in Pediatric Patient /Brain Death	(a) Intensive care (posting in PICU and lectures by Consultant PICU) (b) Approch and Monitoring of a comatose child (c) Coma in Pediatric population/ metabolic coma (d) Brain death
(XX) Neurological manifestations of systemic diseases	(a) Metabolic encephalopathies (b) Disorders of acid/base/electrolyte disturbances (c) Neurological complications of pulmonary, gastrointestinal, hepatic, renal, cardiac, haematological, neoplastic and endocrine diseases
(XX) Neurological and Neurosurgical emergencies	(a)Neurological and Neurosurgical emergencies (b)Management of hydrocephalus (c)Surgical management of raised intracranial pressure (d)Traumatic brain injury (e) Management of Refractory status epilepticus
(XXII) Clinical Epidemiology	(a) Study designs (b) Hypothesis testing (c)Research methodology (d) Biostatistics (e) Critical appraisal of a journal article
(XXIII) Ethics in Medicine	(a)Ethical dilemmas in neuro critical care (b)End of life care in chronic neurological illnesses (c)Ethics in research and publication
(XXIV) Neuroinformatics	(a) Use of technology in neurology education/training

	(b) Tele medicine in Child Neurology (c) Role of technology in health care access
(XXV) Rehabilitation in Pediatric Neurology	(a) Principles of physiotherapy (b) Assistive devices (c) Treatment of spasticity (d) Occupational therapy
(XXVI) Community Pediatrics	(a) National Programmes (b) AFP surveillance (c) Vaccine prevent able neurological disorders
(XXVII) Non-epileptiform paroxysmal disorders and sleep disorders	(a)Headache (b)Breath holding spells (c)Syncope (d)Sleep disorders
(XXVIII) Neuroendocrine and autonomic nervous system disorders	(a) Disorders of the hypothalamus & Pituitary gland in Childhood and Adolescence (b) Disorders of micturition and defecation (c) Disorders of the autonomic nervous system
(XXIX) Neuroimaging	(a) Principles of neuroimaging (Neuro sonogram, CT and MRI) (b) Imaging in epilepsy (c) Newer imaging modalities (d) Metabolic imaging (e) Interventional radiology
(XXX) Electrophysiology	(a) Electroencephalography (b) Nerve conduction studies (c) Needleelectromyography and single fiber EMG (SFEMG) (d) Evoked potentials
(XXXI) Therapeutic advances in neurological disorders	a. Gene therapy b. Regenerative medicine (Stem cell therapy) c. Exon skipping d. Therapies for Lysosomal storage disorders e. Precision medicine

7. POSTINGS / ROTATIONS

The trainees will be posted as per the following rotations during which they will beundergoing clinical training in all core areas as detailed below. They will be given postings as follows:

Area of Posting	**Year of residency**	**Duration of Posting**
Neurophysiology	Last 2 months of 1st year	2 months
Adult Neurology	1 month in 2nd year	1 month
Neonatology	2nd year	1 month
Child development unit	2nd year	1 month
Department of Radiology (Neuroradiology)	2nd year	1.5 months
Neurosurgery	3rd year	1 month
Department of psychiatry (Child and adolescent Psychiatry)	3rd year	1 month
Trauma and Emergency department	2nd year	15 days
Physical and Medical Rehabilitation (PMR)	3rd year	15 days
Ophthalmology	3rd year	15 days
Total		**10 months**

Objectives to be achieved in rotation postings

A. Neurophysiology

Nerve Conduction Studies: Principles of nerve conduction studies, Reporting nerve conduction studies, Diagnosis of cases including – peripheral neuropathies (motor/sensory/mixed, axonal and demyelinating), Radiculoneuropathies (AIDP/CIDP) and brachial plexopathies

Electromyography: Principles of EMG, Reporting the studies, Diagnosis of cases including– myopathies, muscular dystrophies, myasthenia gravis, anterior horn cell diseases

Evoked Potential Studies : Principles and indications of evoked potential studies including visual, brainstem auditory and somatosensory evoked potentials (median and tibial), Reporting the findings of these studies, Diagnosis of cases including – demyelinating illnesses including optic neuritis and demyelination, inflammatory diseases like neurosarcoidosis, NeuroBehcet's disease

Electroencephalography (EEG): Principles and indications of EEGs, Method of electrode placement, Interpretation of the EEG recordings, Diagnosis of cases including – Electroclinical syndromes(neonatal/childhood onset), epileptic encephalopathies (West syndrome, Lennox Gastuat syndrome, Landau Kleffner syndrome and epilepsy with electrical status epilepticus in sleep), Intensive care recordings (Periodic complexes in encephalitides and non-convulsive status epilepticus and normal studies

B. Adult Neurology: Recognize various adult neurological disorders to formulate differential diagnoses and understand the basis of diagnosis and management of adult neurological disorders. Acute stroke management, adult neuromuscular, epilepsy and movement disorder clinic

C. Neonatology: Diagnose and manage the neonatal neurological disorders, describe a plan for evaluating and managing neonates with neurological problems including intracranial haemorrhage, neonatal seizure, neonatal meningitis, hypoxic ischemic encephalopathy, kernicterus, metabolic encephalopathies, and congenital infections

D. Child Development Unit: Management of children with neurodevelopmental disorders, autism, ADHD, cerebral palsy, learning disorders etc. Assessment of DQ/SQ/IQ.

E. **Department of Radiology (Neuroradiology):** Reporting of pediatric and adult neuroradiology cases- stroke, trauma, tumour, demyelination, leukodystrophies, vascular malformations and Intervertebral disc prolapse. Pattern recognition for various childhood neurological illnesses including malformations, metabolic, infections etc.

F. **Neurosurgery:** Diagnosis and management of cases of intracranial space-occupying lesions, tumours, trauma, spinal cord injury and malformations. VP shunt and EVD insertion.

G. **Department of psychiatry (Child and adolescent Psychiatry):** Diagnosis and management of various psychological disorders in children including psychosis, eating disorders, childhood-onset schizophrenia, conversion disorders etc. IQ assessment using various scales.

H. **Trauma and Emergency department**: Evaluation and management of status epilepticus, acute febrile encephalopathy, management of raised intracranial pressure, coma, central nervous system infections, acute flaccid paralysis, and neurological complications of trauma cases. Procedures such as central line, peripheral line insertion, intubation and mechanical ventilation, hemodialysis and plasmapheresis.

I. **Physical and Medical Rehabilitation:** Principles of rehabilitation emphasizing the role of physiotherapy, occupational therapy, speech therapy and special education. Pediatric rehabilitation in cerebral palsy, traumatic brain and spinal cord injury. Procedures- Peripheral nerve stimulation, cystourethrography, cystoscopy, Achilles tendon release, Split thickness skin grafting. Decide the right candidate for administration of Botulinum toxin where indicated and administration of the same. Decide the extent of disability in children with neurological disorders and be able to calculate the degree of impairment required for disability certification.

J. **Ophthalmology**: Vision assessment in infants and children, Cerebral visual impairment and visual rehabilitation methods

8. ACADEMIC ACTIVITY:

Sr. No.	Academic Activity	Frequency
1.	Journal Club	Once in 2 weeks.
2.	Seminar	Once 2 weeks
3.	Neurogenetic Meet	Once a month
4.	Case presentation	Once in 2 weeks
5.	Combined Round/Grand Round	Once a week
6.	Joint inter-departmental academic meet	Once a month
7.	Audit presentation	Once a month
8.	Institutional level CME	As per the institute's schedule
9.	Thesis review	Once in 6 months

Note:

A. Bedside and outpatient clinical training for patient care management.

B. Trainees shall be required to participate in the teaching and training programme of Undergraduate students and interns.

9. LOGBOOK

The DM Pediatric Neurology student shall maintain a log book of the work carried out by them and the training program undergone during the period of training. The logbook shall be checked and assessed periodically by the faculty members imparting the training. Maintenance of performance records in the log book is mandatory. Certified and assessed copies should be made available at the time of practical examination for review by examiners.

10. DISSERTATION:

10.1 Every student registered for DM shall carry out a research project under a Guide allotted, the result of which shall be written up and submitted in the form of a dissertation.

10.2 Work for writing the dissertation is aimed at contributing to the development of a spirit of enquiry, besides exposing the student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

10.3 The dissertation will be done in accordance with institutional protocol.

10.4 **The process is to be completed within six months of admission to the DM Pediatric Neurology programme:**

Sr. No.	**Activity**	**January admission**	**July admission**
1.	Selection of topic in consultation with PG Guide	March / April	September / October
2.	Approval by Department PG Committee		
3.	Institute Scientific Committee approval	May / June	November / December
4.	Institute Ethics Committee approval		
5.	Final approval letter by Academics Section	30th June	31st December
6.	Final submission to the academic section	30th June (Third Year)	31st December (Third Year)

11. ASSESSMENT

A. FORMATIVE ASSESSMENT

During the training includes:

1. Evaluation of clinical skills, academic performance and personal attributes will be an ongoing process. Periodic formative assessment will be done every 6 months and feedback will be given to the trainee.
2. Systematic theory and practical assessment will be done at the end of each year.

A 1. Six monthly Progress Report

The progress of the will be monitored with the help of a six-monthly structured report. The report will contain details pertaining to attendance, teaching-learning activities, clinical duties, teaching assignments, practical work, marks obtained at intermediate examinations, papers/posters presented, research publications and progress of dissertation work. The performance of the student will be graded by the PG Guide and the Head of the Department. PG guide will provide feedback to the student.

Report	**July Session**		**January session**	
	Period	**To be submitted**	**Period**	**To be submitted**
First	July to December	7 th January	January to June	7 th July
Second	January to June	7 th July	July to December	7 th January
Third	July to December	7 th January	January to June	7 th July
Fourth	January to June	7 th July	July to December	7 th January
Fifth	July to December	7 th January	January to June	7 th July
Sixth	January to June	10th June	July to December	10th December

A 2. Formative Assessment (600 Theory + 600 Practical = Total 1200 Marks)

Theory (600 Marks)

Sr. No.	Schedule	Marks	Pattern and Marks Distribution
1.	At the end of the First year	100 (1 Paper)	10 Questions x 10 Marks each (Total Duration 3 hrs.)
2.	At the end of the Second year	100 (1 Paper)	10 Questions x 10 Marks each (Total Duration 3 hrs.)
3.	Pre-professional	400 (4 Papers of 100 marks each)	As per the Final Professional Examination
	Total	**600 Marks**	

Practical(600Marks)

Sr. No.	Schedule	Marks	Pattern and Marks Distribution
1.	At the end of the First year	100	2 Cases x 25 Marks each (Total 50 marks) 25 for OSCE (5 stations of 5 marks each) 25 for viva voce
2.	At the end of the Second year	100	2 Cases x 25 Marks each (Total 50 marks) 25 for OSCE (5 stations of 5 marks each) 25 for viva voce
3.	Pre-professional	400	As per the Final Professional Examination
	Total	**600 marks**	

B. SUMMATIVE ASSESSMENT/FINAL PROFESSIONAL ASSESSMENT

Eligibility for Professional/Summative Assessment:

1. Candidate should secure a minimum of 50% marks in Theory and Practical separately in formative assessments, in order to be eligible to appear for Professional Examination
2. At least four out of six, six-monthly progress reports should be satisfactory
3. Minimum 80% attendance in each year of training.
4. Acceptance of Dissertation is mandatory
5. Minimum one scientific paper OR poster presentation at an international/national/state/zonal/regional conference / scientific society meeting.
6. Minimum one scientific research paper – for publication/ accepted for publication / sent for publication in a peer-reviewed indexed scientific journal.

At the end of the training will be as follows:

Sr. No.	Exam	Distribution of Marks
1	Theory	4 Papers each of 100 marks = 400 marks
2	Practical	Clinical Case + Viva = 400 marks

The DM Pediatric Neurology examination shall be in two parts:

B.1 Theory:

There shall be 4 papers; each of 3 hours duration carrying 100 marks each.

Each paper shall consist of ten questions for 10 marks each

Paper	Title	Marks
Paper I	**Basic Sciences – (consisting of Neuro anatomy, Neurophysiology, Neurochemistry, Neuropathology, Neuro Microbiology, Parasitology, Immunology, Epidemiology and Genetics.)**	100
Paper II	**Clinical Pediatric Neurology**	100
Paper III	**Clinical pediatric neurology, Research methods, community neurology, allied disciplines**	100
Paper IV	**Recent advances in Pediatric Neurology**	100
	Total	**400**

B.2 Practical: The practical examination should consist of the following

1. Long Case - **100 Marks**
2. Short Case I – **50 Marks**
3. Short Case II - **50 Marks**
4. Ward rounds- 4 cases* 25 marks each=**100 marks**
5. Structured Viva Voce **(100 marks)**
    a. Journal critical appraisal- 20 marks
    b. Dissertation defense– 20 Marks
    c. Radio- imaging Investigations i.e. CT/MRI interpretation - 20 marks
    d. Neurophysiological records interpretation such as BERA, NCV, EMG, EEG - 20 marks
    e. Interpretation of genetic/metabolic investigations- 20 marks

Note:

(A) Minimum 40% marks in each paper and aggregate of 50% marks in order to be declared pass in theory exam

(B) Minimum 50% marks required in Theory & Practical separately, in order to be declared successful in the summative exam

12. RECOMMENDED READING		
Book Name	**Author**	**Publication/Edition**
1. Swaiman's Pediatric Neurology: Principles and Practice	Kennith FS Waiman, Stephen Ashwal, https://journals.lww.com/annalsofian/pages/default.aspx	Elsevier publishers
2. DeJong's, The Neurological examination	Wiliam WCampbel Richard J Barohn	Wolters Kluwer, Lippincot William And Wilkins
3. Localization in clinical neurology	Paul WBrazis Joseph CMasden	Wolters Kluwer, Lippincot Wiliam And Wilkins
4. Fenichel's Pediatric Neurology: Asign and Symptom Approach	Jeric Pina Garza	Elsevier
5. Volpe's Neurology of Newborn	Joseph J Volpe	Elsevier
6. Aicardi's Diseases of the Nervous System in Childhood	Alexis Arzimanoglou	Mac Keith Press
7. Movement disorders in childhood	Harvey S Singer Joseph Jankovic Jonathan WMink	Saunders, Elsevier
8. Acute Pediatric Neurology	Thomas Sejersen Ching HWang	Springer
9. Diagnostic imaging: Pediatric Neuroradiology	James Barkovich	Amirsys, Elsevier

10. Pediatric Neuroradiology: Clinical Practice Essentials	Choudhary Asim	
11. Inborn metabolic diseases: Diagnosis and treatment	Jean Marie Saudbary Matthias Baumgartner	Springer
12. Electromyography and Neuromuscular disorders-clinical electrophysiologic correlations	David CPreston Barbara E Shapiro	Elsevier
13. Niederm eyer Electroencephalography: Basic principles, clinical applications and related fields	DonaldLSchomerFernando HLopes	OUPUSA
14. EEG in clinical practice	K Radhakrishnan M JK Murthy	Paras medical books
15. Fischand Spehlmann EEG primer	Bruce JFisch	Elsevier
16. IAP textbook of Pediatric Neurology	Anoop Verma PAM Kunju	Paras Medical Books
17. Epileptic syndromes in infancy, childhood and adolescence, 6*Ed	Michele Bureau, Pierre Genton, Charlotte Dravet	John Libbey Eurotext

18. De Myer's The Neurologic Examination: A programmed text edition	Jose Biller	Mc Graw Hil
19. AClinical guide to Inherited Metabolic diseases, 3rded	Clarke J	Cambridge University Press, 2005
20. Neurology of hereditary metabolic diseases In children	Lyon G, Kolodny E, Pastores G	3rd edition

Recommended Journals

1. Annals of Indian Academy of Neurology Epilepsies
2. Epilepsy and Behavior Epilepsy Research
3. European Journal of Pediatric Neurology Journal of Child Neurology
4. Journal of Developmental and Behavioral Pediatrics. Journal of Pediatric Neurology
5. Lancet Neurology Pediatric Neurology Seizure
6. Seminars in Pediatric Neurology Developmental Medicine &Child Neurology