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Department of Pediatrics

Curriculum

For

**Post-graduate Degree Course
M.D. (Pediatric Medicine)**

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1. Goal

The Goal of M.D. (Pediatrics) Program is to provide training in Pediatrics and Neonatology to produce competent specialists who are able to provide basic and speciality care of the highest order to neonates, infants, children and adolescents at the community level and at primary, secondary and tertiary levels of health care, and to act as future trainers, teachers, and researchers in the field of Pediatrics and Neonatology.

2. Course Description

MD (Pediatrics)

Duration: 3 years

Eligibility: MBBS

3. Intramural and Extramural Rotation

MD (Pediatrics):

- At least 4 and not more than 8 months in Neonatology.
- At least 3 and not more than 6 months in sub-speciality areas: Intensive Pediatric Care Unit (IPCU), Genetic Clinic, Thalassemia Care Centre, Emergency Pediatric Services.
- At least nil and maximum 6 months in Allied areas: Hematology, Infectious Diseases, Dermatology, Cardiology, Nephrology, Chest Medicine, Gastroenterology.

The Department of Pediatrics will decide the posting of students in Neonatology and Allied Branches and Sub- speciality areas.

4. Syllabus

- I) **Basic Sciences and Laboratory Medicine as applied to Pediatrics and Childhood Diseases.**
- II) **Clinical Epidemiology**
- III) **Ethics in Pediatrics and Child Care**
- IV) **Computers in Pediatrics**
- V) **Pediatric and Neonatal Therapeutics**
 - Effects of physical and physiological changes on the pharmacokinetics of commonly used medications in Pediatrics.
 - Recognition of drugs that are contraindicated, and used with extreme caution in specific pediatric populations.
 - Effects of maternal therapy on the fetus and the neonate.
 - Secretion of drugs in the breast-milk.
 - Patient education and parent education for appropriate drug dosing, formulations and administration techniques.
- VI) **Preventive Pediatrics**
 - National Health programs relevant to Pediatrics and Child Care.
 - Epidemiology of common health problems and diseases.
 - Vital statistics: Maternal Mortality Rate, Perinatal Mortality Rate, Neonatal Mortality Rate, Under-5 mortality Rate: Definitions, National Status, Determinants, Interventions aimed at reduction of the rates.
 - National Immunization Programs and policies.
 - Other vaccines not included in national immunization program.
- VII) **Social Pediatrics**
 - Child labour, Child abuse, Child neglect, Failure to thrive, Social issues relevant to Pediatrics.
 - Media and children
 - Children at special risk
 - Adoption
 - Environmental health hazards.

VIII) Psychological Behavioral manifestations disorders

- Identification and assessment of Psychological and behavioral disorders.
- Intervention and management strategies for Psychological and behavioral disorders.

IX) Growth and Development

- Normal pattern and factors affecting growth and development. Recognition of normal variants of growth and development.
- Developmental assessment in infancy and childhood.
- Physiological changes during adolescence and problems facing adolescents.
- Assessment of growth.
- Deviations from normal patterns of growth and development: Recognition, Prevention, Early intervention and Management.
- Tools for assessment of growth and development at various ages including Indian adaptations.

X) Nutrition

- Understanding of energy balance in humans.
- Basic biochemistry of proteins, carbohydrates and fats.
- Proximate Principles, Vitamins, Minerals and Micronutrients: Biochemistry, Physiological Functions, Daily Requirements, Manifestations and Management of deficiency and excess states.
- Normal requirement of protein, fat, carbohydrate for newborns, children, adolescents and pregnant and lactating women.
- Nutritional values of common Indian foods.
- Breastfeeding and lactation management
- Infant feeding and weaning foods.
- Balanced diet.
- Assessment of nutritional status.
- Nutritional disorders-Etiology, Clinical features, patho-physiology, pathogenesis and management
- Pathological features of various nutritional disorders.
- Planning of diet during illness.
- Total parental nutrition.

XI) Fluids and Electrolytes

Pathophysiology of body fluids, fluid therapy, electrolytes, acid-base balance, parenteral and enteral fluid therapy

XII) Emergency pediatric services

- Pediatric resuscitation
- Evaluation of critically ill child.
- Pediatric Emergencies and poisoning.
- Pediatric injuries and injury control and accidents.
- Insect, animal and snakebites.
- Planning and management of pediatric intensive care unit
- Anesthesia, perioperative care and pain management.
- Principles of drug therapy.

XIII) Genetics

- Principles and molecular basis of genetic disorders.
- Clinical features and management of genetic and chromosomal disorders.
- Prenatal diagnostic techniques and neonatal screening tests.
- Effects of teratogenic agents.
- Genetic counseling.
- Gene therapy.

XIV) Metabolic diseases

Metabolic diseases of protein (amino acids), carbohydrates, fats, mucopolysaccharides, purines, pyrimidines, heme and others

XV) Neonatology: The fetus and neonatal infant

- High-risk pregnancy
- Assessment of fetal growth, wellbeing and maturity.
- Fetal distress: Manifestation, identification and management
- Maternal diseases and their effects on the fetus and newborn.
- Assessment of fetal wellbeing.
- Identification and management of various fetal diseases.
- High-risk infant – identification and management.

- Delivery room emergencies, resuscitation of newborn and care of normal new born.
- Birth injuries.
- Adaptation of newborn.
- Examination of newborn and assessment of maturity.
- Etiology, clinical features, pathophysiology, pathogenesis and management of various diseases of newborn.
- Neonatal transport.
- Neonatal procedures.
- Developmental assessment, and early intervention programmes for infants at high risk for developmental delay.
- Care of newborn in the community.
- Planning and organization of level I, level II, Level III Neonatal care centers.

XVI) Infectious diseases

- Clinical features, management of viral, bacterial, fungal, spirochetal, rickettsial, parasitic, protozoal and other infections.
- Prevention and management of nosocomial infections.
- Infection control and preventive measures.
- Immunization against infections diseases.
- Fever
- Laboratory techniques for diagnosis of infections diseases.
- Infections in immunocompromized host.
- Clinical syndromes caused by various infections agents.

XVII) Immunological system and its disorders

- Components of immune system and their functions.
- Disorders of immune system – Etiology, Clinical features, pathophysiology, pathogenesis and management.
- Pharmacotherapy.
- Transplantation medicine.
- Allergic diseases – etiology, clinical features, patho-physiology, pathogenesis and management.
- Relevant diagnostic and therapeutic modalities in various immunological and allergic disorders.

XVIII) Rheumatic diseases and connective tissue disorder of childhood.

Etiology, pathogenesis, manifestation, laboratory diagnosis and management of Rheumatic diseases in childhood and adolescents

XIX) Respiratory system

- Development of respiratory system, congenital anomalies.
- Physiology of respiration and mechanics of ventilation.
- Etiology, clinical features, pathophysiology, pathogenesis and management of various respiratory diseases.
- Pathological features of various respiratory diseases.
- Relevant diagnostic and therapeutic modalities in respiratory diseases in children.
- Pharmacotherapy of respiratory diseases.

XX) Cardiovascular system

- Embryology of heart and vascular system.
- Adaptations of cardiovascular system at and after birth.
- Etiology, pathophysiology, pathogenesis, clinical features and management of congenital and acquired heart and vascular diseases and rheumatic heart disease.
- Rheumatic fever – Epidemiology, clinical features, pathophysiology, pathogenesis, prevention and management.
- Relevant diagnostic and therapeutic modalities in heart diseases in children.
- Congestive cardiac failure – Etiology, pathophysiology, pathogenesis, clinical features and management.
- Pharmacotherapy of cardiovascular diseases.

XXI) Gastrointestinal tract

- Development of gastrointestinal tract, hepatobiliary system and their abnormalities.
- Physiology of digestion.
- Etiology, pathophysiology, pathogenesis, clinical features and management of various gastrointestinal and hepatobiliary and other abdominal diseases.
- Pathological features of gastrointestinal, hepatobiliary and pancreatic disorders.
- Surgical emergencies in gastrointestinal tract diseases.

XXII) Hematology and Neoplastic diseases

- Physiology of erythropoiesis, leukopoiesis and physiology of hemostasis.
- Etiology, pathophysiology, pathogenesis, clinical features and management of hematological and oncological diseases.
- Laboratory diagnosis and other relevant diagnostic and therapeutic modalities in hematological and oncological disorders.
- Pharmacotherapy of Hematological and Oncological Diseases.
- Component therapy in Pediatric Practice.

XXII) Nephrology and genitourinary tract

- Development and developmental anomalies of the kidneys and the genitourinary tract.
- Physiology of urine formation and metabolic functions of the kidney.
- Etiology, pathophysiology, pathogenesis, clinical features and management of various disorders of the kidney and the genitourinary tract.
- Pathological features of diseases of the kidney and genitourinary tract.
- Relevant diagnostic and therapeutic modalities for diseases of the kidney and the genitourinary tract.
- Pharmacotherapy of renal and genitourinary disorders.
- Management of end stage renal disease.

XXIV) Central and peripheral Nervous System

- Development of the brain, spinal cord and peripheral nervous system and their anomalies.
- Neurological evaluation of newborns, infants and children.
- Etiology, pathophysiology, pathogenesis, clinical features and management of various diseases affecting central nervous system and peripheral nervous system.
- Seizures in childhood.
- Neuromuscular diseases – etiology, clinical features, pathophysiology and management.

XXV) Endocrine system

- Synthesis, physiological functions and pharmacological actions of various hormones.
- Disorders of the endocrine glands.
- Pubertal development and its disorders.

XXVI) Congenital and acquired disorders of eye, ear, nose, throat, bones and joints.

XXVII) Miscellaneous diseases

- Unclassified diseases including SIDS, Sarcoidosis, Progeria histiocytosis, chronic fatigue syndrome.
- Metabolic bone diseases.
- Genetic skeletal dysplasias.

XXVII) Development of diagnostic approach for and interpretation of symptomatology and clinical signs in infants, children and adolescents.

XXVIII) Basics of Research Methodologies and Ethical aspects of Clinical Research

5. List of skills

1. Elicitation of history from parents, guardians, relatives and patients regarding complaints previous diseases and therapy, events around birth, prenatal period, growth and development, diet and immunization, socio-educational and economic background and other relevant aspects.
2. Conduct physical examination of well and sick newborn babies, infants, children, adolescents and adults.
3. Accurately measure length or height, weight, head circumference and plot the data on an appropriate chart.
4. Accurately measure mid-arm circumference of children aged 1-5 years.
5. Identify abnormal growth patterns.
6. Interpret data obtained by anthropometric measurement and developmental assessment.
7. Assess nutritional status and determine if the child is getting adequate nutrition.
8. Provide nutritional advice for newborn babies, infants, children and adolescents.
9. Provide advice regarding breast-feeding, weaning and balanced diet.
10. Provide advice regarding healthy & hygienic practices with a view to prevent diseases, disorders, injuries, accidents and poisoning.
11. Develop a diagnostic approach for clinical problems in newborns, infants, children and adolescents.
12. Discuss the characteristics of the patient and of the illness that must be considered when making the decision to manage the patient in the outpatient setting or admit to hospital.
13. Discuss the differential diagnosis of symptoms, signs and presentations in neonates, infants, children and adolescents.
14. Undertake relevant investigations for diagnostic and prognostic evaluation taking into consideration the risks, benefits and costs involved.
15. Convince parents and guardians regarding undertaking investigations and obtain their co-operation and valid legal consent.
16. Interpretation of laboratory Reports.

Counseling parents regarding the child's health status, health needs, illness & disabilities

17. Performance of Diagnostic & Therapeutic Procedures:

- Venepuncture (10)
- Intravenous access for administration of drugs and intravenous fluids (10)
- Administration of drugs via intra-dermal, intra-muscular or subcutaneous routes (5 each)
- Administration of drugs and fluids through intra-osseous route (2)
- Lumbar puncture to draw out cerebro-spinal fluid for examination (5)
- Sub-dural tap (2)
- Ventricular tap (1)
- Peritoneal (Ascitic) tap for diagnostic and therapeutic purposes (2)
- Pleural tap for diagnostic and therapeutic purposes (4)
- Collection of blood from an artery for arterial blood gas analysis (4)
- Obtaining Central IV Access (3)
- End tracheal Intubation in Newborn babies, Infants, Children & Adolescents (5)
- Cardiopulmonary Resuscitation (5)
- Supra-pubic tap for obtaining a urine sample (5)
- Administration of drugs via a nebulizer (5)
- Catheterization of the urinary Bladder (5)
- Liver Biopsy (4)
- Kidney Biopsy (2)
- Arterial Cannulation for monitoring of Blood Pressure (5)
- Peritoneal dialysis (2)
- Cannulation of the umbilical vessels (7)
- Exchange Transfusion (5)
- Bone Marrow aspiration (2)
- Bone Marrow Biopsy (2)
- Pericardiocentesis (2)
- Cardioversion (4)

(The numbers in the brackets indicate the minimum number of the procedure that a post-graduate student needs to observe/ assist/ perform/ supervise)

6. Teaching/Learning Activities and Opportunities

Inpatient management

Outpatient Management

Presentation of cases on Clinical Rounds

Topic presentation.

Case discussions.

Clinicopathological conferences.

Clinicoradiological conferences.

Biopsy Meetings.

Mortality Review Meetings

Journal Club

Guest Lectures

In-house lectures

Conferences,

Seminars.

CME sessions

Participation in Workshops

Presentation of Papers

Teaching Undergraduate students.

Teaching Postgraduate students & paramedical staff.

Use and Maintenance of biomedical equipments and gadgets

Counseling regarding performance of procedures, disease process and prognostication

Group discussions Sessions

Assisting in diagnostic and therapeutic procedures.

Performing diagnostic and therapeutic procedures.

Patient/Health education.

7. Research

All the postgraduate students will be exposed to Research Methodologies through their participation in the Journal Club.

A candidate registered for M.D. (Pediatrics) will be submitting a dissertation to the university.

This will be a pre-requisite for appearing for the MD examination. The dissertation will be done under the guidance and full satisfaction of the post-graduate teacher under whom the candidate is registered.

8. Reference Books and Suggested Reading

(A) Books & Textbooks

(I) *General Medicine & Pediatrics*

- Nelson Textbook of Pediatrics (Behrman)
- Forfar Textbook of Pediatrics (Campbell).
- Rudolph's Pediatrics (Rudolph).
- Pediatric Medicine (Avery).
- Textbook of Pediatrics (Udani).
- Manual of Pediatric therapeutics (Graef).
- Manual of Neonatal Care (Cloherty)
- Common symptoms (Illingworth).
- Pediatric diagnosis (Green).
- Signs and symptoms in Pediatrics (Tunnessen).
- Harrison's Principles of Internal Medicine.
- Mcleod's clinical methods.
- IAP Textbook of Pediatrics
- Harriet Lane Handbook (Barone).
- Handbook of Pediatric Physical diagnosis (Barness)

(II) Super-speciality Reference Books

Neurology : Pediatric Neurology : Principles and Practice(Swaiman)

Clinical Pediatric Neurology :A Signs and symptoms approach (Fenichel)

Nephrology: Pediatric kidney diseases (Edelmann).

Pediatric Nephrology (Holliday).

Clinical Pediatric Nephrology (Kher & Makker).

Cardiology: Nada's Pediatric Cardiology (Fyker).

Heart Disease in Infants, children and Adolescents (Adams-Moss's).

Rheumatic fever (Markowitz).

Peroiff - Pediatric Cardiology for Practitioner's (Myung Park).

How to read Pediatric ECGs (Park).

Hematology: Clinical hematology in medical practice (de Gruchy's).
Blood diseases of infancy and childhood (Miller).
Nathan & Oski's Hematology of Infancy and childhood
(Nathan).

Living with Thalassemia (Aggarwal)

Gastroenterology: Pediatric Gastroenterology (Sheila Sherlock)
Liver disorders in childhood (Mowat)
Paediatric Gastroenterology (Anderson).

Respiratory: Kendig's disorders of the respiratory tract in children
(Chernick).

Infectious Diseases & Parasitology:

Poliomyelitis (Huckstep).

Tuberculosis in Children. (Miller)

Essentials of Tuberculosis in children. (Vimlesh Sheth)

Parasitology (Charterjee)

Textbook of Pediatric Infections diseases(Fegin & Cherry)

Growth & Development :

The Development of the Infant and Young Child –

Normal & Abnormal (Illingworth)

The Normal Child (Illingworth).

Miscellaneous : Protein Energy Malnutrition

a) Alleyne,

b) Waterlow.

Essentials of Human Genetics (Kothari & Mehta)

Genetics in Medicine (Thomson & Thomson).

Birth Defects encyclopedia (Buyses).

Smith's Recognizable Patterns of Human Malformation
(Jones).

Breastfeeding – A Guide for the medical profession
(Lawrence)

Medical Embryology (Langman).

Frontiers in social Pediatrics (Patwari)

Medical emergencies in children (Singh)

Immunization : Immunization in Practice (Mittal)

Immunization update (Mittal)

(B) Journals in Pediatrics & Other Periodicals

Year Book of Pediatrics – Stockman III

Indian Pediatrics

Indian Journal of Pediatrics

Pediatrics Today.

Archives of Diseases in Childhood

Pediatrics

Journal of Pediatrics

Drugs.

State of the World's Children (UNICEF)

Perinatology Clinics of North America

Recent Advances in Pediatrics

Advances in Pediatrics

Recent Advances in Pediatrics – Suraj Gupte (Ed.)

(C) Sub-speciality Journals

Pediatric Nephrology

Pediatric Cardiology

Pediatric Neurology

Pediatric Radiology

Pediatric Neurosurgery

Journal of Infection

9. Evaluation Form

(A) Postgraduate Seminars

Name:

Date:

Seminar Topic:

Evaluation Points:

1. Presentation:
2. Completeness of Preparation:
3. Cogency of presentation:
4. Use of audiovisual aids.
5. Understanding of subjects:
6. Ability to answer questions:
7. Time scheduling:
8. Consulted all relevant literature:
9. Overall performance.

Guidance for Scoring

0

1

2

3

4

Poor

Below average

Average

Above average

Very Good

Faculty members:

- 1.
- 2.
- 3.

Mean Score:

Evaluation Form

(B) Case Presentation

Name:

Date:

Case Title:

1. Logical order in presentation:
2. Cogency of presentation:
3. Complete /Relevant history:
4. Accuracy of General Physical Examination:
All signs elicited correctly.
5. Accuracy of Systemic Examination:
6. Diagnosis – Logical flow based on History & findings:
7. Order of differential diagnosis (logical):
8. Investigations required:
(Complete list, Relevant order, Interpretation of investigations,
Unnecessarily investigations asked)
9. Treatment: Principles & details
10. Patient/Relatives communication
(Diagnosis & Management
Health education)

Overall:

1. Abilities to react to questioning:
2. Abilities to defend diagnosis:
3. Ability to justify differential diagnosis:
4. Acceptability of plan of management
5. Confidence

Score	0	1	2	3	4
	Poor	Below average	Average	Above average	Very Good

Faculty members:

- 1.
- 2.
- 3.

Mean Score:

Evaluation Sheet
(C) Journal Club

Name:

Date:

Points for consideration:

Score

1. Choice of article relevant:
2. Cogency of presentation:
3. Whether understood and conveyed the purpose of the article:
4. How did he defend article:
5. Whether cross references have seen consulted:
6. Understood explained basics of statistic in article:
7. Whether relevant information mentioned from other similar articles.
8. Use of audio visual aids:
9. Presentation:
10. Response to questioning:

Score

0	1	2	3	4

Poor	Below average	Average	Above average	Very Good

Faculty members:

- 1.
- 2.
- 3.

Mean Score:

Evaluation Form

(D) Clinical Work

Name:

Date:

Points to be considered:

1. Punctuality:
2. Regularity of attendance:
3. Quality of ward work (procedures):
4. Maintenance of case records:
5. Presentation of cases during rounds (approach):
6. Investigation work up:
7. Bedside manners:
8. Rapport with patients:
9. Rapport with colleagues:
10. Motivation for blood donation:
11. UG teaching (if applicable):
12. Counseling patient's relatives:
13. Management of emergencies:
14. Knowledge of Pediatrics as a subject:

Score	0	1	2	3	4
	Poor	Below average	Average	Above average	Very Good

Faculty members:

- 1.
- 2.
- 3.

Mean Score: