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**CURRICULUM/STATUTES & REGULATIONS  
FOR  
5 YEARS DEGREE PROGRAMME  
IN  
PAEDIATRICS  
(MD Paediatrics)**

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**UNIVERSITY OF HEALTH SCIENCES,  
LAHORE**

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Curriculum/Statutes & Regulations -MD Paediatrics  
**STATUTES**

**1. Nomenclature Of The Proposed Course**

The name of degree programme shall be MD Paediatrics. This name is well recognized and established for the last many decades worldwide.

**2. Course Title:**

MD Paediatrics

**3. Training Centers**

Departments of Paediatrics (accredited by UHS) in affiliated institutes of University of Health Sciences Lahore.

**4. Duration of Course**

The duration of MD Paediatrics course shall be five (5) years (first year in Part I, first two years in Part II and next three years in Part III) with structured training in a recognized department under the guidance of an approved supervisor.

The course is structured in three parts:

**Part I** is structured for the 1<sup>st</sup> calendar year. The candidate shall undertake didactic training in Basic Medical Sciences, Behavioural Sciences and Biostatistics & Research Methodology. At the end of first year the examination shall be held in Basic Medical Sciences. The clinical training in fundamental concepts of Internal Medicine shall start from the 1<sup>st</sup> day of enrollment.

**Part II** is structured for the 1<sup>st</sup> and 2<sup>nd</sup> calendar years. The candidate shall undertake clinical training in fundamental concepts of Internal Medicine. At the end of 2<sup>nd</sup> year, the examination shall be held in fundamental concepts of Internal Medicine. The clinical training in Paediatrics shall start from 3<sup>rd</sup> year onwards in the in recognized institutions.

**Part III** is structured for 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> calendar years in MD Paediatric Medicine. The candidate shall undergo training to achieve educational objectives of MD Paediatrics (knowledge & skills) along with rotation in

Curriculum/Statutes & Regulations -MD Paediatrics relevant fields. Over the five years duration of the course, candidate will spend total time equivalent to one calendar year for research during the training. Research can be done as one block in 5<sup>th</sup> year of training or it can be done in the form of regular periodic rotations over five years as long as total research time is equivalent to one calendar year.

### **5. Admission Criteria**

1. For admission in MD Paediatrics course, the candidate shall be required to have:

- MBBS degree
- Completed one year House Job
- One year experience in Paediatrics/Internal Medicine/Allied medical discipline in the given order of preference
- Registration with PMDC
- Passed Entry Test conducted by the University & aptitude interview by the Institute concerned
- Having up to the mark credentials as per UHS rules (no. of attempts in each professional, any gold medals or distinctions, relevant work experience, Rural/ Army services, research experience in a recognized institution, any research article published in a National or International Journal) may also be considered on case to case basis.

2. Exemptions: A candidate holding FCPS/MRCP/Diplomate American Board/equivalent qualification in Internal Medicine shall be exempted from Part-I & Part-II Examinations and shall be directly admitted to Part-III Examinations of the specialty, subject to fulfillment of requirements for the examination.

### **6. Registration and Enrollment**

- Total number of students enrolled for the course must not exceed 2 per supervisor/year.

- The maximum number of trainees that can be attached with a supervisor at a given point of time (inclusive of trainees in all years/phases of MD training), must not exceed 6.
- Beds to trainee ratio at the approved teaching site shall be at least 5 beds per trainee.
- The University will approve supervisors for MD courses.
- Candidates selected for the courses after their enrollment at the relevant institutions shall be registered with UHS as per prescribed Registration Regulations.

### ***7. Accreditation Related Issues of the Institution***

#### **A). Faculty**

Properly qualified teaching staff in accordance with the requirements of Pakistan Medical and Dental Council (PMDC)

#### **B). Adequate Space**

Including class-rooms (with audiovisual aids), demonstration rooms, computer lab and clinical pathology lab etc.

#### **C). Library**

Departmental library should have latest editions of recommended books, reference books and latest journals (National and International).

- Accreditation of Paediatrics training program can be suspended on temporary or permanent basis by the University, if the program does not comply with requirements for residents training as laid out in this curriculum.
- Program should be presented to the University along with a plan for implementation of curriculum for training of residents.
- Programs should have documentation of residents training activities and evaluation on monthly basis.
- To ensure a uniform and standardized quality of training and availability of the training facilities, the University reserves the right to make surprise visits of the training program for monitoring purposes and may take appropriate action if deemed necessary.

## **AIMS AND OBJECTIVES OF THE COURSE**

### **AIM**

The aim of five years MD programme in Paediatrics is to train residents to acquire the competency of a specialist in this field so that they can become good teachers, researchers and clinicians in their specialty after completion of their training.

### **GENERAL OBJECTIVES**

MD Paediatrics training should enable a resident in:

- **History and Physical Examination** - The effective acquisition of a medical history and the performance of a comprehensive physical examination in paediatric patients with acute and chronic diseases necessitating hospital admission.
- **Case Presentations** - Students are expected to effectively record an initial history and physical examination and follow-up notes as well as deliver comprehensive oral presentations to their team members based on these written documents.
- **Test Interpretation** - Basic understanding of routine laboratory and ancillary tests, including complete blood count, chemistry panels, ECG, chest x-rays, pulmonary function tests, and body fluid cell counts. In addition, students will properly understand the necessity of incorporating sensitivity, specificity, and pre-test probability in the ordering of individual tests in the context of evaluating paediatric patients' signs and symptoms.
- **Diagnostic Decision Making** - The formulation of a differential diagnosis with up-to-date scientific evidence and clinical judgment using history and physical examination data and the development of a prioritized problem list to select tests and make effective therapeutic decisions.
- **Therapeutic Decision Making** - This objective includes assessing the risks, benefits, and costs of varying, effective treatment options; involving the patient in decision-making via open discussion; selecting drugs from within classes; and the design of basic treatment programs and using critical pathways when appropriate.

- **Core Internal Medicine Concepts** - The development of a basic understanding of core Internal Medicine concepts.
- **Communication and Relationships with Patients and Colleagues** - The establishment of rapport with paediatric patients by identifying important psychosocial issues and providing patient-centered care through specific medical treatment as well as education. In addition, the development of effective communication skills demonstrating respect, compassion and integrity in working relationships with fellow students, house staff, faculty, nurses, and ancillary personnel. In each of these components, sensitivity to racial and cultural diversity should be demonstrated.
- **Bioethics of Patient Care** - The development of a functional understanding of informed consent, advanced directives, and the physician-patient relationship.
- **Self-directed Learning** - The identification of key information resources and the utilization of the medical literature to expand one's knowledge base and to search for answers to medical problems. They will keep abreast of the current literature and be able to integrate it to clinical practice.
- **Preventive Medicine** - The promotion of health via adult immunizations, periodic health screening, and risk factor assessment and modification.
- **Research and Scientific Knowledge** - Practice evidence-based learning with reference to research and scientific knowledge pertaining to their discipline.

## SPECIFIC LEARNING OUTCOMES

Following competencies are expected from a resident completing MD Paediatric training;

- Acquisition of basic knowledge of growth and development (physical, physiologic and psychosocial) of a child and of its birth clinical application from through adolescence.
- Identify social, economic, environ-mental, biological and emotional determinants of child and adolescent health, and institute diagnostic, therapeutic, rehabilitative, preventive and promotive measures to provide holistic care to children
- Acquisition of the knowledge necessary for the diagnosis and initial management of common pediatric acute and chronic illnesses.
- Structured didactic exposure and evaluation covering the full spectrum of outpatient care of the pediatric patient.
- An understanding of the influence of family, community and society on the child in health and disease.
- Gain experience in the day-to-day management of seriously ill children. This management will include:
  - Monitoring patient medications
  - Calculation of fluids and electrolytes, both deficit and maintenance
  - Calculation and management of caloric intake
  - Recording of output (urine and stool)
  - Interpretation of laboratory and imaging studies
  - Delivering "bad news"
  - Discharge planning
- Be able to plan rehabilitation of children suffering from chronic illness and handicap, and those with special needs
- Demonstrate the ability to formulate a reasonable differential diagnosis based on the history obtained and the physical examination performed
- Development of communication skills that will facilitate the clinical interaction with children, adolescents and their families and thus ensure that complete, accurate data are obtained and perform an appropriate physical examination.
- Use developmental assessment as part of the physical examination for all age groups. This includes an understanding of the administration of, and limitations of, the developmental screening test; this includes an understanding of the importance of gestational age in the developmental assessment of young children
- Recognize the importance of determining the psychosocial condition (status) of the parents and the child
- Measure and understand the vital signs in children of various age groups · Routinely and accurately measure, record, and plot growth parameters on appropriate growth charts.
- Health supervision
  - Immunization information and advice
  - Safety issues

- Dietary advice
- Information on expected child-development
- Age-appropriate behavioral concerns
- Conduct health supervision visits on healthy adolescents incorporating of preventive counseling and identification high-risk behaviors in these key areas:
  - Sexuality/sexual activity (sexual orientation, contraception, STDs)
  - Substance abuse, including alcohol
  - Tobacco use
  - Personal safety (motor vehicles and seatbelt use, firearms, violence)
- Identify common chromosomal disorders and is able to provide genetic counseling · Assess, classify and rehabilitate nutritional disorders in child
- Decide and implement suitable treatments considering safety, cost factors, complications and side effects
- Advise mothers with concerns regarding breastfeeding
- Experience the process of resuscitation and stabilization of the newborn
- Become familiar with the APGAR scoring system and its interpretation
- Gain experience in the diagnosis and management of fluid and electrolyte disturbances
- Describe the physical and behavioural signs of the child who has been physically or Sexually abused and his/her responsibilities for reporting these suspected events
- Demonstrate professionalism in relationships with the pediatric patient and family
- Self-analyze to become aware of personal biases or prejudices
- Respect the cultural differences found in varying patient populations
- Observe rules of privacy and confidentiality, particularly in regards to the adolescents
- Develop critical thinking skills and the ability to use evidence-based medicine
- Development of strategies for health promotion as well as disease and injury prevention
- Utilize community agencies, practicing physicians and community health care programs to facilitate optimal care
- Research a particular subject in depth and utilize appropriate learning resources including texts and Literature, consultation with peers, senior colleagues and/or allied professionals to communicate this clearly and effectually in writing.
- Develop positive attributes which will serve as the basis for a successful professional

**Procedural Skills:**

Residents must be able to perform competently all medical and invasive procedures essential for the practice of general and advanced paediatrics. This includes technical proficiency in taking informed consent, performing by



using appropriate indications, contraindications, interpretations of findings and evaluating the results and handling the complications of the related procedures mentioned in the syllabus

**Additional Procedural Skills:** Residents should be instructed in additional procedural skills that will be determined by the training environment, residents' practice expectations, the availability of skilled teaching faculty, and privilege delineation.

**Interpretative skills:** Residents should be able to interpret basic as well as advanced laboratory data as related to the disorder/disease

**Electives:** In addition, the resident will elect rotations in a variety of electives including Allergy/Immunology, Cardiology, Endocrinology, Gastroenterology, Genetics, Hematology/Oncology, Infectious Disease, Nephrology, Neurology, Pulmonology, Rheumatology, Pediatric Surgery, nutrition, nuclear medicine or any of the medicine subspecialty consultative services or clinics. They may choose electives from each medicine subspecialty and from offerings of other departments. Residents may also select electives at other institutions if the parent department does not offer the experiences they want.

**Research:** All residents in the categorical program are required to complete an academic outcomes-based research project during their training. This project can consist of original bench top laboratory research, clinical research or a combination of both. The research work shall be compiled in the form of a thesis, which is to be submitted for evaluation by each resident before end of the training. The designated Faculty will organize and mentor the residents through the process, as well as journal clubs to teach critical appraisal of the literature.

**Outpatient Experiences:**

Residents should demonstrate expertise in diagnosis and management of patients in acute care clinics and longitudinal clinic and gain experience in Paediatric Dermatology , Endocrinology, Gastroenterology, Hematology Oncology, Neurology, Pulmonology, Rheumatology, Clinical immunology and allergy etc.

**Interdisciplinary Medicine:**

Child Psychiatry, Adolescent Medicine, Dermatology, Emergency Medicine, General Surgery, Gynecology, Neurology, Occupational Medicine, Ophthalmology, Orthopedics and Sports Medicine, Otolaryngology, Physical Medicine and Rehabilitation, Urology, Ophthalmology, Otolaryngology, Pediatric Radiology etc.

**Community Practice:**

Residents experience the practice of medicine in a non-academic, non-teaching hospital setting. The rotation may be used to tryout a practice that the resident later joins, to learn the needs of referring physicians or to decide on a future career path.

## REGULATIONS

### 1. Scheme of the Course

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

Course Structure	Components	Examination
<b>Part I</b>	<ul style="list-style-type: none"> <li>• <b>Basic medical sciences</b> Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Behavioural Sciences and Biostatistics &amp; Research Methodology</li> </ul>	Part-I examination at the end of 1 <sup>st</sup> year of MD Paediatrics programme. <ul style="list-style-type: none"> <li>• <b>Written:</b> Paper I: MCQs Paper II: SEQs</li> </ul>
<b>Part-II</b>	<ul style="list-style-type: none"> <li>• <b>Fundamental Concepts in Internal Medicine :</b> Training in clinical techniques of Internal Medicine with compulsory rotations for two years starting from the first day of enrollment</li> </ul>	Part-II examination at the end of 2 <sup>nd</sup> year of MD Paediatrics programme. <ul style="list-style-type: none"> <li>• <b>Written:</b> Papers 1 &amp; 2: Problem-based questions in Internal Medicine</li> <li>• <b>Oral &amp; Practical/ Clinical Examination</b> <ul style="list-style-type: none"> <li>• OSCE</li> <li>• Clinical Examination (Long case, Short cases)</li> </ul> </li> <li>• <b>Log Book</b></li> </ul>
<b>Part-III</b>	<p style="text-align: center;"><b><u>Clinical component of Part III</u></b></p> <ul style="list-style-type: none"> <li>• <b>Professional Education in Paediatrics</b> Training in Paediatrics during 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> years of MD programme  Three years of training with compulsory/ optional rotations in related fields</li> </ul> <p style="text-align: center;"><b><u>Research component of Part III</u></b></p> <ul style="list-style-type: none"> <li>• <b>Research and Thesis Writing:</b> Research work/Thesis writing project must be completed and thesis be submitted before the end of training.</li> </ul>	Part-III examination in specialized components of Paediatrics at the end of 5 <sup>th</sup> year of MD programme <ul style="list-style-type: none"> <li>• <b>Written:</b> Papers 1 &amp; 2: Problem-based questions in the subject</li> <li>• <b>Oral &amp; Practical / Clinical Examination</b> <ul style="list-style-type: none"> <li>• OSCE</li> <li>• Clinical Examination (Long case, Short cases )</li> </ul> </li> <li><b>Log Book</b></li> </ul> <p>Part-III thesis examination with defence at the end of fifth (5<sup>th</sup>) year of MD Paediatrics programme.</p>

## **2. Examinations**

### **Part-I Examination**

1. All candidates admitted in MD Paediatrics course shall appear in Part-I examination at the end of 1<sup>st</sup> calendar year.
2. The examination shall be held on biannual basis.
3. The candidate who fails to pass the examination in 3 consecutive attempts availed or un-availed, shall be dropped from the course.
4. The examination shall have two components:

Paper-I MCQs (single best)	100 Marks
Paper-II SEQs	100 Marks
5. Subjects to be examined shall be Basic Sciences relevant to Paediatrics (Anatomy, Physiology, Biochemistry, Pathology, Pharmacology), Behavioural Sciences and Biostatistics & Research Methodology.
6. To be eligible to appear in Part-I examination the candidate must submit;
  - i. duly filled, prescribed Admission Form to the Controller of Examinations duly recommended by the Principal/Head of the Institution in which he/she is enrolled;
  - ii. a certificate by the Principal/Head of the Institution, that the candidate has attended at least 75% of the lectures, seminars, practical/clinical demonstrations;
  - iii. Examination fee as prescribed by the University
7. To be declared successful in Part-I examination the candidate must secure 60% marks in each paper.

## Part-II Examination

1. All candidates admitted in MD Paediatrics course shall appear in Part-II examination at the end of 2<sup>nd</sup> calendar year, and having passed the part I examination.
2. The examination shall be held on biannual basis.
3. The candidate who fails to pass the examination within 3 years of passing the Part-I examination shall be dropped from the course.
4. The examination shall have the following components:

a. Written	200 Marks
b. OSCE	50 Marks
c. Clinical examination	100 Marks
d. Log Book Evaluation	80 Marks (40 marks per year)
5. There shall be two written papers of 100 marks each:

Papers 1 & 2: Principles of Internal Medicine
6. The types of questions shall be of Short/Modified essay type and MCQs (single best).
7. Oral & practical/clinical examination shall be held in clinical techniques in Internal Medicine.
8. To be declared successful in Part-II examination the candidate must secure 60% marks in each component and 50% in each sub-component.
9. Only those candidates, who pass in theory papers, will be eligible to appear in the Oral & Practical/clinical Examination.
10. The candidates, who have passed written examination but failed in oral & practical/ clinical examination, will re-appear only in oral & practical/clinical examination.
11. The maximum number of attempts to re-appear in oral & practical /clinical Examination alone shall be three, after which the candidate shall have to appear in both written and oral & practical/clinical examinations as a whole.

12. To be eligible to appear in Part-II examination the candidate must submit;

- i. duly filled, prescribed Admission Form to the Controller of Examinations duly recommended by the Principal/Head of the Institution in which he/she is enrolled;
- ii. a certificate by the Principal/Head of the Institution, that the candidate has attended at least 75% of the lectures, seminars, practical/clinical demonstrations;
- iii. a certificate of having passed the Part-I examination;
- iv. Examination fee as prescribed by the University.

**Part-III Examination**

1. All candidates admitted in MD Paediatrics course shall appear in Part-III (clinical) examination at the end of structured training programme (end of 5th calendar year), and having passed the part I & II examinations. However, a candidate holding FCPS / MRCP / Diplomate American Board/equivalent qualification in Internal Medicine shall be exempted from Part-I & Part-II Examinations and shall be directly admitted to Part-III Examinations, subject to fulfillment of requirements for the examination.
2. The examination shall be held on biannual basis.
3. To be eligible to appear in Part-III examination the candidate must submit;
  - i. duly filled, prescribed Admission Form to the Controller of Examinations duly recommended by the Principal/Head of the Institution in which he/she is enrolled;
  - ii. a certificate by the Principal/Head of the Institution, that the candidate has attended at least 75% of the lectures, seminars, practical/clinical demonstrations;
  - iii. Original Log Book complete in all respect and duly signed by the Supervisor (for Oral & practical/clinical Examination);
  - iv. certificates of having passed the Part-I & part-II examinations;
  - v. Examination fee as prescribed by the University.
4. The Part-III clinical examination shall have the following components:
 

▪ Written	300 marks
▪ Oral & practical/clinical examination	300 marks
▪ Log Book Evaluation	120 marks (40 marks per year)
5. There shall be two written papers of 150 marks each.
6. Both papers shall have problem-based Short/Modified essay questions and MCQs.
7. Oral & practical/clinical examination shall have 300 marks for:
 

i. 1 Long Case	100
ii. 4 Short Cases	100(25 marks each)
iii. OSCE	100

8. To be declared successful in Part-III examination the candidate must secure 60% marks in each component and 50% in each sub-component.
9. Only those candidates, who pass in theory papers, will be eligible to appear in the Oral & Practical/ Clinical Examination.
10. The candidates, who have passed written examination but failed in Oral & Practical/ Clinical Examination, will re-appear only in Oral & Practical / Clinical examination.
11. The maximum number of attempts to re-appear in oral & practical /clinical Examination alone shall be three, after which the candidate shall have to appear in both written and oral & practical/clinical examinations as a whole.
12. The candidate with 80% or above marks shall be deemed to have passed with distinction.
13. *Log Book/Assignments:* Through out the length of the course, the performance of the candidate shall be recorded on the Log Book.
14. The Supervisor shall certify every year that the Log Book is being maintained and signed regularly.
15. The Log Book will be developed & approved by the Advanced Studies & Research Board.
16. The evaluation will be maintained by the Supervisor (in consultation with the Co- Supervisor, if appointed).
17. The performance of the candidate shall be evaluated on annual basis, e.g., 40 marks for each year in five years MD Paediatrics course. The total marks for Log Book shall be 200. The log book shall reflect the performance of the candidate on following parameters:
  - Year wise record of the competence of skills.
  - Year wise record of the assignments.
  - Year wise record of the evaluation regarding attitude & behaviour
  - Year wise record of journal club / lectures / presentations / clinico-pathologic conferences attended & / or made by the candidate.

### **3. Submission / Evaluation of Synopsis**

1. The candidates shall prepare their synopsis as per guidelines provided by the Advanced Studies & Research Board, available on UHS website.
2. The research topic in clinical subject should have 30% component related to basic sciences and 70% component related to applied clinical sciences. The research topic must consist of a reasonable sample size and sufficient numbers of variables to give training to the candidate to conduct research, to collect & analyze the data.
3. Synopsis of research project shall be submitted by the end of the 3<sup>rd</sup> year of MD program. The synopsis after review by an Institutional Review Committee shall be submitted to the University for consideration by the Advanced Studies & Research Board, through the Principal / Dean /Head of the institution.

### **4. Submission of Thesis**

1. Thesis shall be submitted by the candidate duly recommended by the Supervisor.
2. The minimum duration between approval of synopsis and submission of thesis shall be one year, but the thesis can not be submitted later than 8 years of enrolment.
3. The research thesis must be compiled and bound in accordance with the Thesis Format Guidelines approved by the University and available on website.
4. The research thesis will be submitted along with the fee prescribed by the University.

### **5. Thesis Examination**

1. All candidates admitted in MD course shall appear in Part-III thesis examination at the end of 5<sup>th</sup> year of their training course.
2. Only those candidates shall be eligible for thesis evaluation who have passed Part I, II & III (clinical) Examinations.
3. The examination shall include thesis evaluation with defense.



4. The Vice Chancellor shall appoint three external examiners for thesis evaluation, preferably from other universities and from abroad, out of the panel of examiners approved by the Advanced Studies & Research Board. The examiners shall be appointed from respective specialty. Specialists from Internal Medicine and related fields may also be appointed/co-opted, where deemed necessary.
5. The thesis shall be sent to the external examiners for evaluation, well in time before the date of defense examination and should be approved by all the examiners.
6. After the approval of thesis by the evaluators, the thesis defense examination shall be held within the University on such date as may be notified by the Controller of Examinations. The Controller of Examinations shall make appropriate arrangements for the conduct of thesis defense examination in consultation with the supervisor, who will co-ordinate the defense examination.
7. The thesis defense examination shall be conducted by two External Examiners who shall submit a report on the suitability of the candidate for the award of degree. The supervisor shall act as coordinator.

### ***6. Award of MD Paediatrics Degree***

After successful completion of the structured courses of MD Paediatrics and qualifying Part-I, Part-II and Part-III examinations, the degree with title MD Paediatrics shall be awarded.

## CONTENT OUTLINE

### Part I MD Paediatrics

#### **Basic Sciences:**

Student is expected to acquire comprehensive knowledge of Anatomy, Physiology, Pathology Biochemistry and Pharmacology relevant to the clinical practice appropriate for Paediatrics.

## **1. Anatomy**

### General Organization of the Body

- Anatomical nomenclature
- Terms of position & plane
- Divisions of the body according to the regions and organ systems
- Detailed Anatomy of the organ systems, their blood supply, nerve supply, lymphatic drainage and important gross relations to other organs
- Developmental Anatomy and associated common congenital abnormalities
- 6. Cell biology, cell cycle, cellular differentiation and proliferation.
- Tissues of Body: Light and electron microscopic details, structural basis of function, regeneration and degeneration of the organ systems.

### General Features of Human Development

- Features of mitotic and meiotic modes of cell division. Genetic consequences of meiotic division.
- Abnormal mitotic and meiotic divisions of clinical importance.
- Gametogenesis: origin of germ cells.
- Oogenesis: prenatal and postnatal development of ova.
- Spermatogenesis: proliferation and maturation of male germ cells. Abnormal gametes, their clinical significance.
- Ovulation, fertilization and the consequences of fertilization.

### Early Embryonic Development:

- Cleavage, morula and blastocyst formation and implantation. Formation of the three primary germ layers.
- List of the derivatives of the respective germ layers.

### Period of the Growing Fetus:

- Various stages and salient features of the fetus development

### Extraembryonic Membranes:

- Development, functions and anomalies of yolk sac, amnion, chorion, allantois, umbilical cord and placenta.

### Development of the External Body Form:

- Shaping of the head, neck, trunk and limbs. Common developmental anomalies associated with this.
- Development and fate of the bronchial grooves, arches and pouches. Their derivatives and anomalies.

Teratogenesis:

- Factors known to be involved in the development of congenital anomalies. Concept of critical periods.

Structural and Functional Organization of the Tissues of Body

- Classification of tissues and identification of various tissues in routine histological preparations under the light microscope.

The Epithelial Tissue

- General structure, functions and classification of epithelia
- Their location in the body
- General characters of serous and mucous membranes
- General structural features of exocrine and endocrine glands

The Connective Tissue

- Cartilage
- Structure of bone marrow. Cell lines seen in haemopoiesis.
- Factors required for bone growth.

The Muscular Tissue

- Structural and functional differences between the smooth skeletal and cardiac types of muscle.
- Fine structure of skeletal and cardiac muscle fibers, and its relationship to the mechanism of contraction.
- Specialized conducting tissue of the heart.

The Neural Tissue

- The neuron, morphology of the perikaryon and its processes.
- Coverings of the axons in the peripheral nerves and the central nervous system.
- Types of neuroglia and their functions.
- Process of myelination in the peripheral nerves and the central nervous system.
- Axon terminals and synapses. Nerve fiber degeneration and regeneration.

The Nervous System

- Development of the nervous system and common developmental anomalies.

The Brain

- Subdivisions of the brain.
- External morphology of cerebellum, lobes, surface, sulci and gyri. External morphology of cerebellum and its subdivisions.
- External morphology of midbrain, pons and medulla.
- Different grey matter masses in the brain.
- Ventricular system of the brain.
- Circulation of cerebrospinal fluid and its composition.

- Blood supply of the brain. Parts of the cranial dura, formation and drainage of dural sinuses. 8. Appearance of CT and MRI scans and identification of structures. 9. Cerebrum as seen in horizontal sections.

#### Cerebral Cortex

- Gross and microscopic organization of the cortex, location of motor and sensory cortical areas.
- Functions and blood supply of various regions. White matter of the cerebrum, definition of association, commissural and projection fibers and their role in cortical functioning. Internal capsule, location, fibre content and blood supply.

#### Limbic System

- Core structures of the limbic system.
- Other nuclei and pathways associated with the limbic system.
- Functions of thalamus, hypothalamus and the limbic system.

#### Basal Ganglia

- Subdivisions, connections, functions and effects of lesions.

#### Thalamus

- Nuclear groups, afferent and efferent connections and their functional correlations.

#### Hypothalamus

- The nuclei, afferent and efferent connections and their functional correlations.
- Effects of lesions.

#### Internal Structure of Cerebellum

- Cerebellar cortex: organization and functions.
- Cerebellar nuclei: main connections.
- Cerebellar peduncles, cerebellar afferent and efferent connections, functional correlations.
- Effects of lesions.

#### Spinal Cord

- External morphology, meninges and blood supply of the spinal cord. Relationship of the "segments" to vertebrae at different ages.
- Internal structure of the spinal cord, organization of the grey and white matter.
- Variations in the structure of the grey matter at different levels and location of the important nuclei.
- Location of ascending and descending tracts, and their functions.
- Effects of injury or disease.

#### Peripheral Nervous System

- Anatomy and functions of cranial nerves with their intracranial and extracranial course and distribution.
- Location of various cranial nerve nuclei.

- Anatomy and functions of spinal nerves.

### Organs of Special Senses

- Development of special sense organs and common developmental anomalies of the eye, ear and nose.
- Basic mechanisms of olfaction, taste, vision and hearing.
- The nose skeleton, walls of the nasal cavity, morphological features, nasal conchae, meatuses, location of openings of the sinuses.
- Mucosa of the nasal cavity, blood supply and nerve supply.
- The paranasal sinuses, their location and general morphology.

### Olfaction

- Structure of olfactory mucous membrane, receptors, olfactory pathway and its termination.
- Characters of smell and its significance.

### The Eye & Orbit

- Walls, bony constituents and salient morphological features.
- Disposition of the contents of the orbit including muscles, nerves and vessels. Structure and function of eyelids.
- Conjunctival sac, lacrimal gland and lacrimal apparatus, structure and functions.
- Orbicularis oculi muscle, attachments, nerve supply and functions.

### Eyeball

- Tunics of the eyeball and their anatomical constituents.
- Microscopic anatomy of cornea and lens, layers of retina.
- Chambers of the eye, boundaries and contents.
- Formation, circulation and functions of aqueous humour, sinus venous sclera (canal of Schlemm), filtration angle.
- General morphological and structural features of refracting media.
- Blood supply of retina.
- The visual pathway and effect of lesions at different levels.
- Pupillary light reflex and its pathway.
- Accommodation, its mechanism and pathway.
- Colour vision and colour blindness.
- Photopic, scotopic and binocular vision.
- Field of vision and stereoscopic vision.

### The Ear

#### External ear:

- Skeleton, general morphology of the auricle and the external acoustic meatus.
- Blood supply and nerve supply of the external ear.
- Tympanic membrane, size, shape, structure and nerve supply.

#### Middle ear (tympanic cavity):

- Shape, size boundaries and contents.

Internal ear:

- General morphology of bony labyrinth. Parts of membranous labyrinth, their general morphology, location of special sensory areas and nerve supply.
- Mechanism of hearing, auditory receptors and auditory pathway.
- Functions of the Vestibular apparatus.

Organ of Taste

- Structure of taste buds and location.
- Gustation receptors, gustatory pathway and its termination.

Gastrointestinal System

- Development of the intestinal tract and common developmental anomalies e.g. oesophageal fistulae, Meckel's diverticulum, atresias.
- Rectal and associated urinary bladder anomalies related to partitioning of the cloaca.
- Rotation of gut, physiological herniation and its withdrawal and related anomalies.
- Development and partitioning of the coelomic cavity and formation of the diaphragm.
- Parts, relations, history, functional correlation with structure, common pattern of blood supply, nerve supply and lymphatic drainage of the mouth, tongue and salivary glands, oesophagus, stomach, small intestine, appendix, colon (including caecum), rectum, anal canal, liver, gallbladder, bile ducts and pancreas.

Cardiovascular System

- Development of the heart and vascular system and common developmental anomalies such as septal defects, patent ductus arteriosus, Fallot's tetralogy and coarctation of aorta.
- Microscopic structure of the heart including conducting system
- Characteristics of the cardiac muscle contraction, duration, refractory period, pacemaker and rhythmicity.
- General structural features of atria, ventricles, conducting tissues, and valves of the heart and their relationship to cardiac function.
- Blood supply of heart.
- Structure and functions of the arteries, arterioles, capillaries and veins.

Urinary System

- Development of the urinary system and common developmental anomalies.
- Morphology, including microscopic structure of the nephron.
- Relations, common pattern of blood supply, nerve supply and lymphatic drainage of the kidneys, ureters, urinary bladder, urethra and prostate.

Respiratory System

- Development of the respiratory system and common developmental anomalies.
- Histology of the trachea, bronchi and the lung.
- Physiological anatomy and structure of the respiratory system.

### Larynx

- General form and skeleton of the larynx
- Blood and nerve supply of the larynx

### Endocrine and Reproductive System

- Development and common developmental anomalies of the pituitary, thyroid, parathyroid, adrenal glands, testis, uterine tubes, ovary, uterus etc.

### Musculoskeletal System

- Functions of the skeletal system.

### Bones

- Identification of bony outlines on plain x-ray.
- Classification of bones.
- Bone growth and ossification.
- Blood supply of all long and small bones of human body

### Joints

- Classification of joints
- Factors contributing to the stability of joints.
- Movements of the joints of shoulder, elbow, hip, knee and ankle.
- Movements of the shoulder girdle as a whole, supination and pronation of forearm, inversion and aversion of foot and movements of fingers and thumb. Maintenance of normal posture

### Muscles and Fasciae

- Muscles of the human body
- General disposition, nerve supply and effects of nerve lesions
- Muscle attachments, group actions and nerve supply.

### Body cavities:

- Abdominal, thoracic, cranial, pelvic cavity
- A general description of the boundaries, land marks and surface anatomy of the internal organs and dermatomes of the body cavities
- General disposition, morphology, relations, blood and nerve supply, lymph nodes and areas of drainage of the viscera contained in these cavities.
- Identification of bony outlines on plain X-ray.

## 2. Physiology

- Cellular organization, structure function correlations and physiological alterations in the endocrine organ systems of body

### Structural and Functional Organization of the Cells of Body

- Concept of cells as the structural, functional and genetic units of the body.

- Composition of protoplasm, division into cytoplasm and nucleus.
- Role of macromolecules in the structural organization of the cell.
- Cell components with their role in cell function.
- Diversity of cell morphology as related to the varied functional demands. Physical activities of the living cells, intracellular movements, cellular locomotion, endocytosis and exocytosis.
- Basic concepts of the principles of transport through cell membrane, membrane potential and action potential.
- The cell cycle and cell division.
- Energy balance, metabolism & nutrition
- Uses of cell and tissue cultures.
- DNA and RNA structure and protein synthesis.

#### Blood:

- General properties and composition.
- Structure, production, functions and fate of red blood cells, white blood cells and platelets.
- Structure, formation, functions, and fate of haemoglobin.
- Blood volume and principles of its measurement.
- Disorders of blood.
- Blood groups (ABO, Rh and other systems), blood transfusion and exchange transfusion.
- Precautions and hazards of blood transfusion.
- Plasma proteins, their production and functions.
- Diagnosis of various types of anaemias and leukaemias.
- Values of various components of blood in different age groups e.g. haemoglobin, WBCs, hormones etc.
- Interpretation of complete blood picture, haematological changes in infectious and non infectious paediatric diseases

#### Cardiovascular System:

- Cardiac muscle: electrical and mechanical properties.
- Metabolism
- Origin of the Heart beat, the electrical activity of the heart (normal and findings in cardiac and systemic diseases)
- Mechanism of production of heart sounds, their location, characters and relationship with the cardiac cycle.
- The normal electrocardiogram and characters of its various components. Significance of its parts, voltage and calibration, principles and methods of recording, electrocardiographic leads and general information obtained from ECG.
- Physiology and abnormalities of apex beat.
- Cardiac output, amount, distribution, measurement, control, cardiac index and cardiac reserve.
- Echocardiography, exercise tolerance test and the basis of ETT.
- Patho-physiology of cardiac failure, valvular heart disease and hypertension. Interpretation of data of diagnostic tests.
- Dynamics of blood and lymph flow: biophysics
- Arterial and arteriolar circulation, capillary circulation, lymphatic circulation and venous circulation



- Laws of haemodynamics governing flow, pressure and resistance in blood vessels.
- Arterial blood pressure, measurement and regulation.
- Vasomotor system and control of blood vessels.
- Characters of arterial pulse and venous pulse.
- Significance of central venous pressure.
- Mechanism of haemorrhage and shock.
- Coronary, cutaneous, splanchnic and peripheral circulation. Its measurement, control and special features, circulatory changes during muscular exercise
- Cardiovascular regulatory mechanisms local regulation
- Endothelium; systemic regulation by hormones and systemic regulation by nervous system.
- Circulation through special organs: coronary circulation, cerebral circulation and pulmonary circulation.

Respiration:

- Pulmonary ventilation
- Mechanics of respiration, pulmonary volumes, capacities and pressures.
- Transport and exchange of oxygen and carbon dioxide.
- Regulation of respiration. (chemical and neural)
- Physiology of respiratory insufficiencies, hypoxia, dyspnoea, asphyxia and hypercapnia.
- Exercise hypoxia and cyanosis
- Physiological changes due to altitude and space travel
- Principles and methods of artificial respiration.
- Principles of pulmonary function tests.
- Interpretation of data of diagnostic tests.
- Cardiopulmonary resuscitation.
- Patho-physiology of respiratory failure.

Fluid Balance:

- Basic requirements of fluid and electrolytes at different ages .
- Mechanisms of homeostasis
- Influence of disease states
  - a. Renal
  - b. Cardiac
  - c. Gastrointestinal
  - d. Trauma
- Mechanisms of homeostasis
- Abnormalities encountered in disease

Acid-Base Balance:

- Basic requirements of fluid and electrolytes at different ages .
- Mechanisms of homeostasis
- Influence of disease states

Renal function:

- Renal circulation
- Glomerular filtration

- Tubular function
- Water excretion
- Acidification of urine
- Regulation of Na + and K + excretion
- Regulation of extracellular fluid composition and volume. Homeostatic mechanisms to maintain
  - a. Tonicity
  - b. Volume
  - c. H<sup>+</sup> concentration of Extra cellular fluid.

#### Endocrinology:

- General concepts of chemical nature, mechanism, site of action and functions of hormones of the hypothalamus, pituitary, thyroid, adrenal, parathyroid, pancreas, and pineal glands, ovaries and testis.
- Comprehensive knowledge of all hormones including their chemistry, biosynthesis, storage, release, transport, mechanism of inactivation mode and site of action, distribution, physiological and pathological activities and assessment of functions.
- Calcium homeostasis
- Effects of hypo-and hyperactivity of the endocrine glands.
- Production and functions of hormones related to the sex characters in the male and female child.
- Endocrine function of the kidney, heart, lung and gastrointestinal tract

#### Gastrointestinal function:

- Digestion and absorption
- Regulation of gastrointestinal function
- Motility: mastication, swallowing, gastric motility, intestinal motility and gall bladder motility.
- Secretary activity: formation, composition, function and control of saliva, gastric, pancreatic, bile and intestinal secretions.
- GIT hormones controlling activities: Functions of the stomach, pancreas, gall bladder, liver and large intestine. Formation and composition of faeces, mechanism of defecation.
- Circulation of bile. Principles and assessment of liver function tests.
- Interpretation of data, diagnostic tests. . Hyperbilirubinaemia and congenital hyperbilirubinaemias. . Control of hunger, appetite and its disorders.

#### Central Nervous System

- Motor cortex corticospinal and corticobulbar system.
- Basal ganglia
- Cerebellum

#### Autonomic Nervous System

- Overall functions of sympathetic and parasympathetic nervous systems. Autonomic reflex activity.

#### Functional Aspects Of The Nervous System

- Sensory activity: Peripheral sensory receptors, sensory pathways, physiology of pain and disorders of sensations.
- Motor activity: corticospinal and extracortical pathways, cerebellum and Vestibular system.
- Motor neurons, motor units and neuromuscular junction.
- Disorders of motor activity.

#### Muscle and nerve physiology.

- Reflex activity: Monosynaptic stretch reflexes, polysynaptic withdrawal reflexes, general characters of reflexes.
- Electroencephalogram and its uses.
- Sleep, types, physiological changes during sleep.
- Speech mechanism and its disorders.
- Cerebrospinal fluid, cerebral circulation, metabolism and functions.
- Blood brain and blood CSF barriers.

### 3. Biochemistry

- Membrane biochemistry and signal transduction
- Gene expression and the synthesis of proteins
- Bioenergetics; fuel oxidation and the generation of ATP
- Enzymes and biologic catalysis
- Tissue metabolism

#### Vitamins

- Classification, components, sources, absorption and functions (physiological and biochemical role).
- Daily requirements, effects of deficiency and hypervitaminosis.
- Salient morphologic features of diseases related to deficiency or excess of vitamins.

#### Minerals

- Sources of calcium, phosphorous, iron, iodine, fluorine, magnesium and manganese.
- Trace elements and their clinical importance.
- Absorption and factors required for it.
- Functions and fate.

#### Metabolism

- Metabolic rate and basal metabolic rate
- Factors influencing metabolic rate, principles of measurement.

#### Carbohydrates

- Classification and dietary sources.
- Digestion, absorption and utilization of dietary carbohydrates. Glucose tolerance test.
- Glycogenesis, glycolysis, gluconeogenesis, glycogenolysis, processes with the steps involved and effects of hormones.
- Citric acid cycle, steps involved, its significance and the common final metabolic pathway.
- Hexose monophosphate shunt: mechanism and significance.

### Lipids

- Classification of simple, derived and compound lipids.
- Dietary sources.
- Digestion, absorption, utilization and control.
- Fatty acid oxidation with steps involved.
- Ketogenesis and its significance.
- Lipotropic factors and their actions. Lipoproteins, types and importance.

### Proteins and Amino Acids

- Classification and dietary sources of proteins.
- Digestion, absorption, utilization and control.
- Fate of amino acids.
- Urea formation with steps involved.
- Functions and effects of deficiency.

### Nucleoproteins:

- Structure and metabolism.

### Pigment Metabolism

- Basic concept of endogenous and exogenous pigments.
- Causes of pigmentation and depigmentation.
- Disorders of pigment metabolism, inherited disorders, acquired disorders from deficiency or excess of vitamins, minerals, fats, carbohydrates, proteins etc.

### Balanced Diet

- Nutritional requirements at different ages
- Requisites of an adequate diet.
- Role of carbohydrates, fats, proteins, minerals, vitamins and water in diet.
- Principles of nutrition as applied to medical problems
- Biotechnology and concepts of molecular biology with special emphasis on use of recombinant DNA techniques in medicine and the molecular biology of cancer

## **4. Pharmacology**

- The Evolution of Medical Drugs
- British Pharmacopia
- Introduction to Pharmacology.
- Receptors
- Mechanisms of Drug Action
- Pharmacokinetics
- Pharmacokinetic Process
  - a. Absorption
  - b. Distribution
  - c. Metabolism
  - d. Desired Plasma Concentration
  - e. Volume of Distribution
  - f. Elimination

- g. Elimination rate constant and half life
- h. Creatinine Clearance
- Drug Effect
  - a. Beneficial Responses
  - b. Harmful Responses
  - c. Allergic Responses Allergic Responses
- Drug Dependence, Addiction, Abuse and Tolerance
- Drug Interactions
- Basic concepts of pharmacokinetics and dynamics of drugs prescription in pregnancy and in children
- Autonomic Pharmacology

## 5. Pathology

Pathological alterations at cellular and structural level along with brief introduction of Basic Microbiology and Haematological pathology as related to medicine

### Cell Injury and adaptation

- Reversible and Irreversible Injury
- Fatty change, Pathologic calcification
- Necrosis and Gangrene
- Cellular adaptation
- Atrophy, Hypertrophy,
- Hyperplasia, Metaplasia, Aplasia

### Inflammation

- **Acute inflammation**
- Cellular components and chemical mediators of acute inflammation
- Exudates and transudate
- Sequelae of acute inflammation
- **Chronic inflammation**
- Etiological factors and pathogenesis
- Distinction between acute and chronic (duration) inflammation
- Histologic hallmarks
- Types of chronic inflammation, non-granulomatous and granulomatous, and their causes

### Haemodynamic disorders

- Etiology, pathogenesis, classification and morphological and clinical manifestations of Edema, Haemorrhage, Thrombosis, Embolism, Infarction & Hyperaemia
- Shock; classification etiology, and pathogenesis, manifestations.
- Compensatory mechanisms involved in shock
- Pathogenesis and possible consequences of thrombosis
- Difference between arterial and venous emboli

### Neoplasia

- Dysplasia and Neoplasia
- Benign and malignant neoplasms
- Etiological factors for neoplasia

- Different modes of metastasis
- Tumor staging system and tumor grade

#### Immunity and Hypersensitivity

- Immunity
- Immune response
- Diagnostic procedures in a clinical Immunology laboratory
- Protective immunity to microbial diseases
- Tumour immunology
- Immunological tolerance, autoimmunity and autoimmune diseases.
- Transplantation immunology
- Hypersensitivity
- Immunodeficiency disorders
- Immunoprophylaxis & Immunotherapy

#### Haematology

- Normal paediatric blood picture & variations in diseases

#### Microbiology

- A brief account of the classification of microorganisms.
- Role of Microbes In Various Paediatric Diseases
- Infection source

#### Bacterial Growth and Death

- Names, habitat, modes of transmission/infection, pathogenic mechanism and pathological changes produced by bacteria, commonly causing paediatric diseases in Pakistan
- Gram staining and AFB staining, Culture of blood and fluid; details regarding methodology in collection, transportation and preservation.
- Culture media for common pathogens and methods of culture.
- Special culture media. Basis of sensitivity tests.

#### Fungal Diseases

- Names, general morphological features, and paediatric diseases produced by fungi commonly found in Pakistan, including dermatophytes, maduromycosis and opportunistic infections.

#### Important Parasites;

- Names and modes of infection of parasitic paediatric diseases commonly found in Pakistan including amoebiasis, malaria, leishmaniasis, ascariasis, cestodiasis, ankylostomiasis, giardiasis, hydatid disease and guinea worm disease.
- Important viruses
- Sterilization and disinfection
- Sterilization and disinfection
- Immunization
- Nosocomial infections
- Use of investigation and procedures in laboratory
- Sputum, urine, stool, cerebrospinal fluid (CSF), pus, aspirates etc.

## 6. Biostatistics & Research Methodology

- Introduction to bio-statistics
- Introduction to bio- medical research
- Why research is important?
- What research to do?
  - a. Selecting a field for research
  - b. Drivers for health research Hi. Participation in national and international research
  - c. Participation in pharmaceutical company research
  - d. Where do research
  - e. Criteria for a good research topic
- Ethics in health research
- Writing a scientific paper
- Making a scientific presentation
- Searching the literature

## 7. Behavioural Sciences

- Bio-psycho-social (BPS) model of health care
- Use of non-medicinal interventions in clinical practice
  - a. Communication skills
  - b. Counseling
  - c. Informational skills
- Crisis intervention/disaster management
- Conflict resolution
- Breaking bad news
- Medical ethics, professionalism and doctor-patient relationship
  - a. Hippocratic oath
  - b. Four pillars of medical ethics (autonomy, beneficence, non-malficence and justice)
  - c. Informed consent and confidentiality
  - d. Ethical dilemmas in a doctor's life
- Delivery of culturally relevant care and cultural sensitivity
- Psychological aspects of health and disease
  - a. Psychological aspect of health
  - b. Psychological aspect of disease
  - c. Stress and its management
  - d. Psychological aspect of pain
  - e. Psychological aspect of aging

## **Part II MD Paediatrics**

Internal Medicine training for first two years starting from first day of enrollment. Resident should get exposure in the following organ and system competencies (listed below) while considering and practicing each system in terms of: -

- Medical ethics
- Professional values, student teachers relationship
- Orientation of in-patient, out-patients and Dermatological labs
- Approach to the patient
- History taking
- General physical examination
- Systemic examination
- Routine investigations
- Special investigations
- Diagnostic and therapeutic procedures

### **Course Contents:**

#### **1. Cardiovascular Medicine**

*Common and / or important Cardiac Problems:*

- Arrhythmias
- Ischaemic Heart Disease: acute coronary syndromes, stable angina, atherosclerosis
- Heart Failure
- Hypertension – including investigation and management of accelerated hypertension
- Valvular heart disease
- Endocarditis
- Aortic dissection
- Syncope
- Dyslipidaemia

*Clinical Science:*

- Physiological principles of cardiac cycle and cardiac conduction
- Pharmacology of major drug classes: beta blockers, alpha blockers, ACE inhibitors, Angiotensin receptor blockers (ARBs), anti-platelet agents, thrombolysis, inotropes, calcium channel antagonists, potassium channel activators, diuretics, anti-arrhythmics, anticoagulants, lipid modifying drugs, nitrates, centrally acting anti-hypertensives

#### **2. Diabetes & Endocrine Medicine**

*Common and / or Important Diabetes Problems:*

- Diabetic ketoacidosis
- Non-acidotic hyperosmolar coma / severe hyperglycaemia
- Hypoglycaemia
- Care of the acutely ill diabetic
- Peri-operative diabetes care

*Common or Important Endocrine Problems:*

- Hyper/Hypocalcaemia



- Adrenocortical insufficiency
- Hyper/Hyponatraemia
- Thyroid dysfunction
- Dyslipidaemia
- Endocrine emergencies: myxoedemic coma, thyrotoxic crisis, Addisonian crisis, hypopituitary coma, pheochromocytoma crisis

*Clinical Science:*

- Outline the function, receptors, action, secondary messengers and feedback of hormones
- Pharmacology of major drug classes: insulin, oral anti-diabetics, thyroxine, anti-thyroid drugs, corticosteroids, sex hormones, drugs affecting bone metabolism

### **3. Gastroenterology and Hepatology**

*Common or Important Problems:*

- Peptic Ulceration and Gastritis
- Gastroenteritis
- GI malignancy (oesophagus, gastric, hepatic, pancreatic, colonic)
- Inflammatory bowel disease
- Iron Deficiency anaemia
- Acute GI bleeding
- Acute abdominal pathologies: pancreatitis, cholecystitis, appendicitis, leaking abdominal aortic aneurysm
- Functional disease: irritable bowel syndrome, non-ulcer dyspepsia
- Coeliac disease
- Alcoholic liver disease
- Alcohol withdrawal syndrome
- Acute liver dysfunction: jaundice, ascites, encephalopathy
- Liver cirrhosis
- Gastro-oesophageal reflux disease
- Nutrition: indications, contraindications and ethical dilemmas of nasogastric feeding and EG tubes, IV nutrition, re-feeding syndrome
- Gall stones
- Viral hepatitis
- Auto-immune liver disease
- Pancreatic cancer

*Clinical Science:*

- Laboratory markers of liver, pancreas and gut dysfunction
- Pharmacology of major drug classes: acid suppressants, anti-spasmodics, laxatives, anti-diarrhoea drugs, aminosaliclates, corticosteroids, immunosuppressants, infliximab, pancreatic enzyme supplements

### **4. Renal Medicine**

*Common and / or Important Problems:*

- Acute renal failure
- Chronic renal failure
- Glomerulonephritis
- Nephrotic syndrome
- Urinary tract infections
- Urinary Calculus

- Renal replacement therapy
- Disturbances of potassium, acid/base, and fluid balance (and appropriate acute interventions)

*Clinical Science:*

- Measurement of renal function
- Metabolic perturbations of acute, chronic, and end-stage renal failure and associated treatments

## **5. Respiratory Medicine**

*Common and / or Important Respiratory Problems:*

- COPD
- Asthma
- Pneumonia
- Pleural disease: Pneumothorax, pleural effusion, mesothelioma
- Lung Cancer
- Respiratory failure and methods of respiratory support
- Pulmonary embolism and DVT
- Tuberculosis
- Interstitial lung disease
- Bronchiectasis
- Respiratory failure and cor-pulmonale
- Pulmonary hypertension

*Clinical Science:*

- Principles of lung function measurement
- Pharmacology of major drug classes: bronchodilators, inhaled corticosteroids, leukotriene receptor antagonists, immunosuppressants

## **6. Allergy**

*Common or Important Allergy Problems*

- Anaphylaxis
- Recognition of common allergies; introducing occupation associated allergies
- Food, drug, latex, insect venom allergies
- Urticaria and angioedema

*Clinical Science*

- Mechanisms of allergic sensitization: primary and secondary prophylaxis
- Natural history of allergic diseases
- Mechanisms of action of anti-allergic drugs and immunotherapy
- Principles and limitations of allergen avoidance

## **7. Haematology**

*Common and / or Important Problems:*

- Bone marrow failure: causes and complications
- Bleeding disorders: DIC, haemophilia
- Thrombocytopaenia
- Anticoagulation treatment: indications, monitoring, management of over-treatment
- Transfusion reactions
- Anaemia: iron deficient, megaloblastic, haemolysis, sickle cell,

- Thrombophilia: classification; indications and implications of screening
- Haemolytic disease
- Myelodysplastic syndromes
- Leukaemia
- Lymphoma
- Myeloma
- Myeloproliferative disease
- Inherited disorders of haemoglobin (sickle cell disease, thalassaemias)
- Amyloid

*Clinical Science:*

- Structure and function of blood, reticuloendothelial system, erythropoietic tissues

## **8. Immunology**

*Common or Important Problems:*

- Anaphylaxis (see also 'Allergy')

*Clinical Science:*

- Innate and adaptive immune responses
- Principles of Hypersensitivity and transplantation

## **9. Infectious Diseases**

*Common and / or Important Problems:*

- Fever of Unknown origin
- Complications of sepsis: shock, DIC, ARDS
- Common community acquired infection: LRTI, UTI, skin and soft tissue infections, viral exanthema, gastroenteritis
- CNS infection: meningitis, encephalitis, brain abscess
- HIV and AIDS including ethical considerations of testing
- Infections in immuno-compromised host
- Tuberculosis
- Anti-microbial drug monitoring
- Endocarditis
- Common genito-urinary conditions: non-gonococcal urethritis, gonorrhoea, syphilis

*Clinical Science:*

- Principles of vaccination
- Pharmacology of major drug classes: penicillins, cephalosporins, tetracyclines, aminoglycosides, macrolides, sulphonamides, quinolones, metronidazole, anti-tuberculous drugs, anti-fungals, anti-malarials, anti-helminthics, anti-virals

## **10. Medicine in the Elderly**

*Common or Important Problems:*

- Deterioration in mobility
- Acute confusion
- Stroke and transient ischaemic attack
- Falls
- Age related pharmacology
- Hypothermia
- Continence problems

- Dementia
- Movement disorders including Parkinson's disease
- Depression in the elderly
- Osteoporosis
- Malnutrition
- Osteoarthritis

*Clinical Science:*

- Effects of ageing on the major organ systems
- Normal laboratory values in older people

## **11. Musculoskeletal System**

*Common or Important Problems:*

- Septic arthritis
- Rheumatoid arthritis
- Osteoarthritis
- Seronegative arthritides
- Crystal arthropathy
- Osteoporosis – risk factors, and primary and secondary prevention of complications of osteoporosis
- Polymyalgia and temporal arteritis
- Acute connective tissue disease: systemic lupus erythematosus, scleroderma, poly- and dermatomyositis, Sjogren's syndrome, vasculitides

*Clinical Science:*

- Pharmacology of major drug classes: NSAIDS, corticosteroids, immunosuppressants, colchicines, allopurinol, bisphosphonates

## **12. Neurology**

*Common or Important Problems:*

- Acute new headache
- Stroke and transient ischaemic attack
- Subarachnoid haemorrhage
- Coma
- Central Nervous System infection: encephalitis, meningitis, brain abscess
- Raised intra-cranial pressure
- Sudden loss of consciousness including seizure disorders (see also above syncope etc)
- Acute paralysis: Guillian-Barré, myasthenia gravis, spinal cord lesion
- Multiple sclerosis
- Motor neuron disease

*Clinical Science:*

- Pathophysiology of pain, speech and language
- Pharmacology of major drug classes: anxiolytics, hypnotics inc. benzodiazepines, antiepileptics, anti-Parkinson's drugs (anti-muscarinics, dopaminergics)

## **13. Psychiatry**

*Common and /or Important Problems:*

- Suicide and parasuicide
- Acute psychosis

- Substance dependence
- Depression

*Clinical Science:*

- Principles of substance addiction, and tolerance
- Pharmacology of major drug classes: anti-psychotics, lithium, tricyclic antidepressants, mono-amine oxidase inhibitors, SSRIs, venlafaxine, donepezil, drugs used in treatment of addiction (bupropion, disulpham, acamprosate, methadone)

#### **14. Cancer and Palliative Care**

*Common or Important Oncology Problems:*

- Hypercalcaemia
- SVC obstruction
- Spinal cord compression
- Neutropenic sepsis
- Common cancers (presentation, diagnosis, staging, treatment principles): lung, bowel, breast, prostate, stomach, oesophagus, bladder)

*Common or Important Palliative Care Problems:*

- Pain: appropriate use, analgesic ladder, side effects, role of radiotherapy
- Constipation
- Breathlessness
- Nausea and vomiting
- Anxiety and depressed mood

*Clinical Science:*

- Principles of oncogenesis and metastatic spread
- Apoptosis
- Principles of staging
- Principles of screening
- Pharmacology of major drug classes in palliative care: anti-emetics, opioids, NSAIDS, agents for neuropathic pain, bisphosphonates, laxatives, anxiolytics

#### **15. Clinical Genetics**

*Common and / or Important problems:*

- Down's syndrome
- Turner's syndrome
- Huntington's disease
- Haemochromatosis
- Marfan's syndrome
- Klinefelter's syndrome
- Familial cancer syndromes
- Familial cardiovascular disorders

*Clinical Science:*

- Structure and function of human cells, chromosomes, DNA, RNA and cellular proteins
- Principles of inheritance: Mendelian, sex-linked, mitochondrial
- Principles of pharmacogenetics
- Principles of mutation, polymorphism, trinucleotide repeat disorders

- Principles of genetic testing including metabolite assays, clinical examination and analysis of nucleic acid (e.g. PCR)

## **16. Clinical Pharmacology**

*Common and / or Important problems:*

- Corticosteroid treatment: short and long-term complications, bone protection, safe withdrawal of corticosteroids, patient counselling regarding avoid adrenal crises
- Specific treatment of poisoning with:
  - Aspirin,
  - Paracetamol
  - Tricyclic anti-depressants
  - Beta-blockers
  - Carbon monoxide
  - Opiates
    - Digoxin
    - Benzodiazepines

*Clinical Science:*

- Drug actions at receptor and intracellular level
- Principles of absorption, distribution, metabolism and excretion of drugs
- Effects of genetics on drug metabolism
- Pharmacological principles of drug interaction
- Outline the effects on drug metabolism of: pregnancy, age, renal and liver impairment

## **Investigative Competencies**

*Outline the Indications for, and Interpret the Following Investigations:*

- Basic blood biochemistry: urea and electrolytes, liver function tests, bone biochemistry, glucose, magnesium
- Cardiac biomarkers and cardiac-specific troponin
- Creatine kinase
- Thyroid function tests
- Inflammatory markers: CRP / ESR
- Arterial Blood Gas analysis
- Cortisol and short Synacthen test
- HbA1C
- Lipid profile
- Amylase
- Full blood count
- Coagulation studies
- Haemolysis studies
- D dimer
- Blood film report
- Blood / Sputum / urine culture
- Fluid analysis: pleural, cerebro-spinal fluid, ascitic
- Urinalysis and urine microscopy
- Auto-antibodies
- Chest radiograph

- Abdominal radiograph
- Joint radiographs (knee, hip, hands, shoulder, elbow, dorsal spine, ankle)

### **Procedural Competencies**

- The trainee is expected to be competent in performing the following procedures by the end of core training. The trainee must be able to outline the indications for these interventions. For invasive procedures, the trainee must recognize the indications for the procedure, the importance of valid consent, aseptic technique, safe use of local anaesthetics and minimization of patient discomfort.
- Venepuncture
- Cannula insertion, including large bore
- Arterial blood gas sampling
- Lumbar Puncture
- Central venous cannulation
- Initial airway protection: chin lift, Guedel airway, nasal airway, laryngeal mask
- Basic and, subsequently, advanced cardiorespiratory resuscitation

## **Part III MD Paediatrics**

Organ and System Competencies in:

Definition, epidemiology, etiopathogenesis, presentation, complications, differential diagnosis and treatment of the following organ system disorders.

### 1. Growth and Development:

- Principles of growth and development
- Normal growth and development in childhood and adolescence
- Deviations in growth and development
- Sexual maturation and its disturbances
- Failure to thrive and short stature.

Approach to Common Clinical Presentations:

- Short stature
- Obesity
- Precocious and delayed puberty
- Developmental delay
- Impaired learning

### 2. Neonatology:

- Have the knowledge and skills to be able to assess and manage neonates presenting to the Department
- Be able to formulate a differential diagnosis for a variety of common presenting symptoms
- Understand the life-threatening nature of some of the situations and the need to call for help · Be able to lead a resuscitation team
- Understand the pathophysiological processes leading to neonatal cardio pulmonary instability, including the role of thermoregulation
- Understand and recognize the signs and symptoms of neonatal distress
- Be able to perform a management as needed
- Be able to select and interpret appropriate investigations and explain results to parents
- Be able to identify neonates requiring admission, requiring a midwife or health visitor input and identify mothers requiring additional support

Common Clinical Disorders:

- Perinatal care
- Normal newborn care in the labor room and resuscitation
- Low birth weight
- Pre-maturity
- Newborn feeding
- Common transient phenomena
- Common transient phenomena
- Respiratory distress
- Apnea
- Infections
- Jaundice
- Anemia and bleeding disorders



- Neurologic disorders
- Gastrointestinal disorders
- Renal disorders
- Malformations
- Thermoregulation and its disorders
- Understanding of perinatal medicine

Approach to Common Clinical Presentations:

- Normal newborn
- Low birth weight newborn
- Breathless newborn
- Newborn with jaundice
- Newborn with fits

3. Nutrition:

Common Clinical Disorders:

- Maternal nutritional disorders; Impact on fetal outcome
- Nutrition for the low birth weight
- Breast feeding
- Infant feeding including complementary feeding
- Protein energy malnutrition
- Vitamin and mineral deficiencies
- Trace elements of nutritional importance
- Obesity
- Adolescent nutrition
- Nutritional management in diarrhea
- Nutritional management of systemic illnesses (celiac disease, hepatobiliary disorders, nephrotic syndrome)
- Parenteral and enteral nutrition in neonates and children.

Approach to Common Clinical Presentations:

- Lactation management and complementary feeding
- Protein energy malnutrition (underweight, wasting, stunting)
- Failure to thrive

4. Paediatric Cardiology:

- Have the knowledge and skills to be able to assess and manage babies and children presenting with with cardiological disorders · Be able to formulate a differential diagnosis · Understand the life-threatening nature of some of these conditions and when to ask for the help of a cardiologist or others with more specialized expertise Paediatrics
- Understand and recognize the possible cardiac complications of other system disorders
- Be able to select and interpret appropriate cardiological investigations including ECGs at all ages and know the indications for echocardiography
- Understand the pharmacology, indications, side-effects and complications of cardiac drugs used commonly in the emergency department
- Understand when referral for specialist paediatric cardiology assessment for further management is appropriate

Common Clinical Disorders:

- Congenital heart diseases (cyanotic and acyanotic)
- Rheumatic fever
- Rheumatic heart disease
- Infective endocarditis
- Arrhythmia
- Diseases of myocardium (cardio-myopathy, myocarditis)
- Diseases of pericardium
- Systemic hypertension
- Hyperlipidemia in children.

Approach to Common Clinical Presentations:

- Murmur
- Cyanosis
- Edema and Congestive heart failure
- Tachycardia
- Palpitations
- Systemic hypertension
- Arrhythmia
- Shock
- Syncope

5. Paediatric Pulmonology:

- Be able to institute appropriate acute airways management
- Be able to recognize patients with life-threatening asthma who may require ventilation
- Understand the indications and complications of drugs used in intubating severely asthmatic patients
- Understand the infective, allergic and obstructive causes of this condition
  - Be able to recognize pneumothorax and understand the diseases or circumstances predisposing to pneumothorax
- Understand the epidemiology and common presentations of bronchiolitis
- Be able to prioritize and interpret investigations and treatment
- Be able to formulate a differential diagnosis
- Be able to recognize other conditions with similar presentations including cardiac causes
- Understand the principles of management of community-acquired pneumonia according to local antimicrobial resistance

Common Clinical Disorders:

- Congenital and acquired disorders of nose
- Infections of upper respiratory tract, tonsils and adenoids
- Obstructive sleep apnea
- Congenital anomalies of lower respiratory tract
- Acute inflammatory upper airway obstruction
- Foreign body in larynx, trachea and bronchi
- Subglottic stenosis (acute and chronic)
- Trauma to larynx
- Neoplasm of larynx and trachea

- Bronchitis
- Bronchiolitis
- Aspiration pneumonia
- GER
- Acute pneumonia
- Recurrent and interstitial pneumonia
- Suppurative lung disease
- Atelectasis
- Lung cysts
- Emphysema and hyper-inflation
- Bronchial asthma
- Pulmonary edema
- Bronchiectasis
- Pleural effusion
- Pulmonary leaks
- Mediastinal mass.

Approach to Common Clinical Presentations:

- Cough/chronic cough
- "Noisy breathing"
- Wheezy child
- Stridor, hoarseness
- Respiratory distress
- Pneumothorax
- Hemoptysis
- Chest pain
- Dyspnea
- Excessive daytime sleepiness
- Febrile patient with infiltrate
- Bronchiolitis
- Pleural effusion, pleurisy

6. Paediatric Gastroenterology & Hepatology:

- Have the understanding and skills to be able to assess and manage children presenting with gastrointestinal disorders
- Be able to formulate a differential diagnosis
- Understand the life-threatening nature of some of these conditions
- Understand and recognize the possible gastrointestinal complications of other system disorders
- Be able to select and interpret appropriate investigations as well as understand the role of interventional procedures like endoscopies in the investigation of acutely unwell patients
- Understand when to refer for specialist gastroenterological opinion
- Be able to provide appropriate monitoring including measurement of central venous pressure if required

Common Clinical Disorders:

- Diseases of mouth, oral cavity and tongue
- Disorders of deglutition and esophagus
- Peptic ulcer disease

- H. Pylori infection
- Foreign body
- Congenital pyloric stenosis
- Intestinal obstruction
- Malabsorption syndrome
- Acute and chronic diarrhea
- Irritable bowel syndrome
- Ulcerative colitis
- Hirschprung's disease
- Anorectal malformations
- Liver disorders
- Hepatitis
- Hepatic failure
- Chronic liver disease
- Wilson's disease
- Budd-Chiari syndrome
- Metabolic diseases of liver
- Cirrhosis and portal hypertension

Approach to Common Clinical Presentations:

- Acute, persistent and chronic diarrhea
- Abdominal pain and distension
- Nausea, vomiting
- Anorexia, weight loss
- Excess intestinal gas
- Fecal incontinence
- Constipation
- Anorectal discomfort, bleeding, or pruritus
- Food intolerance Gastrointestinal bleeding
- Iron-deficiency anemia
- Malnutrition
- Jaundice
- Hepato-splenomegaly and chronic liver disease
- Hepatic failure and encephalopathy Abdominal distention
- Abnormal liver function test
- Ascites
- Noncardiac chest pain
- Swallowing dysfunction

7. Paediatric Nephrology:

- Have the knowledge and skills to be able to assess and manage children presenting with renal/urinary problems.
- Have the knowledge and understanding of fluid and electrolyte imbalances and blood pressure in children with kidney problems
- Understand the life-threatening nature of some of these conditions
- Be able to perform an accurate assessment and management of fluid status
- Be able to select and interpret appropriate renal investigations including urine microbiology and renal function tests

- Understand when referral for specialist paediatric nephrology, general surgical or urological assessment is appropriate

Common Clinical Disorders:

- Acute and chronic glomerulonephritis
- Nephrotic syndrome
- Hemolytic uremic syndrome
- Urinary tract infection
- VUR and renal scarring
- Renal involvement in systemic diseases
- Renal tubular disorders
- Con-genital and hereditary renal disorders
- Renal and bladder stones
- Posterior urethral valves
- Hydronephrosis
- Voiding dysfunction
- Enuresis
- Undescended testis
- Wilm's tumor
- Fluid-electrolyte disturbances.

Approach to Common Clinical Presentations:

- Hematuria/dysuria
- Abnormalities noted on urinalysis (including proteinuria, hematuria, bacteriuria, pyuria and cylinduria)
- Complaints referable to bladder outlet (urgency, hesitancy)
- Dysuria
- Edema
- Flank or suprapubic pain or tenderness
- Hematuria (gross)
- Hypertension
- Incontinence
- Presenting features of uremia
- Renal colic
- Renal mass or bruit
- Inguinoscrotal swelling
- Renal failure (acute and chronic).

8. Paediatric Neurology:

- Have the knowledge and skills to be able to assess and manage children presenting with neurological disorders
- Be able to perform a developmental assessment appropriate to the Emergency department setting
- Understand and use a range of communication skills with disabled children, their families and other professionals
- Be able to formulate a differential diagnosis
- Understand the life-threatening nature of some of these conditions
- Understand and recognize the possible neurological complications of other system disorders

- Be able to select and interpret appropriate neurological investigations with major abnormalities including EEG and head CT scans
- Understand when referral for specialist neurological opinion is appropriate

Common Clinical Disorders:

- Seizure and non seizure paroxysmal events
- Epilepsy and epileptic syndromes of childhood
- Meningitis
- Brain abscess
- Coma
- Acute encephalitis
- Febrile encephalopathies
- Guillain-Barre syndrome
- Neurocysticercosis and other neuro-infestations
- HIV encephalopathy
- SSPE
- Cerebral palsy
- Neurometabolic disorders
- Mental retardation
- Learning disabilities
- Muscular dystrophies
- Acute flaccid paralysis and surveillance
- Ataxia
- Movement disorders of child-hood
- CNS tumors
- CNS malformations.

Approach to Common Clinical Presentations:

- Limping child
- Convulsions
- Abnormality of gait
- Abnormal speech
- Abnormal vision
- Altered sensation
- Confusion
- Disturbed coordination
- Dizziness, vertigo
- Headache
- Hearing loss
- Localized pain syndromes: Facial pain
- Loss of consciousness; coma
- Memory impairment
- Seizure
- Sleep disorder
- Tremors
- Weakness/paresis (generalized, localized)
- Intracranial space occupying lesion Paraplegia
- Quadriplegia
- Large head

- Small head
- Floppy infant
- Acute flaccid paralysis
- Cerebral palsy and other neuromotor disability

9. Paediatric Hematology and Oncology:

- Have the knowledge and skills to be able to assess and manage children presenting with haematological and oncological disorders
- Be able to formulate a likely differential diagnosis
- Understand the life-threatening nature of some of these conditions
- Understand and recognize the possible haematological and oncological complications of other system disorders
- Understand the normal age-dependent haematological blood values
- Understand the indications, contra indications and complications of the use of blood products
- Understand about national and local blood transfusion policies
- Understand the legal process if faced with parental objection to the use of blood products
- Understand when referral for specialist paediatric haematological or oncological assessment is appropriate

Common Clinical Disorders:

- Deficiency anemia
- Hemolytic anemia
- Aplastic anemia
- Pancytopenia
- Disorders of hemostasis
- Thrombocytopenia
- Blood component therapy
- Transfusion related infections
- Bone marrow transplant/ stem cell transplant
- Acute and chronic leukemia
- Myelodysplastic syndrome
- Hodgkin disease
- Non-Hodgkin's lymphoma
- Neuroblastoma
- Hyper-coagulable states

Approach to Common Clinical Presentations:

- Abnormalities of peripheral smear
- Bleeding, bruising, or petechiae
- Family history of anemia or bleeding disorder
- Lymphadenopathy
- Pallor or fatigue
- Recurrent infections or fever/neutropenia
- Splenomegaly
- Venous or arterial thrombosis, including recurrent thrombosis

10. Paediatric Endocrinology:

- Have the understanding and skills to be able to assess and manage children presenting with endocrine or metabolic disorders
- Be able to formulate a differential diagnosis
- Understand the life-threatening nature of some of these conditions
- Understand and recognize the possible metabolic and endocrine complications of other system disorders
- Be able to select and interpret appropriate endocrine and metabolic investigations
- Be able to measure children accurately and assess their growth using appropriate growth charts, taking into account parental stature and pubertal status
- Be able to assess pubertal stages of development accurately
- Understand when and how to perform endocrine and metabolic investigations in neonates and children
- Understand about the biochemical findings in children presenting with metabolic disease Recognize and be able to manage clinical and biochemical features of electrolyte and acid base abnormalities

Common Clinical Disorders:

- Hypopituitarism/hyperpituitarism
- Diabetes insipidus
- Pubertal disorders
- Hypo- and hyperthyroidism
- Hypo- and hyperparathyroidism
- Adrenal insufficiency
- Cushing's syndrome
- Adrenogenital syndromes
- Diabetes mellitus
- Hypoglycemia
- Short stature
- Failure to thrive
- Gonadal dysfunction and intersexuality
- Pubertal changes and gynecological disorders.

Approach to Common Clinical Presentations:

- Thyroid swelling
- Goiter (diffuse, nodular)
- Ambiguous genitalia
- Asthenia
- Diarrhea
- Disorders of pigmentation
- Hirsutism
- Hypertension refractory to primary therapy
- Hypotension
- Incidentally discovered abnormalities in serum electrolytes, calcium, phosphate, or glucose
- Mental status changes
- Osteopenia
- Polyuria, polydipsia



- Signs and symptoms of osteopenia
- Symptoms of hyper- and hypoglycemia
- Symptoms of hypermetabolism and hypometabolism
- Urinary tract stone
- Weight gain, obesity
- Short stature

11. Paediatric Infectious Disorders:

- Have the knowledge and skills to be able to assess and manage children presenting with infectious diseases and conditions
- Be able to formulate a likely differential diagnosis
- Understand the life-threatening nature of some of these conditions
- Understand and recognize the possible infectious complications of other system disorders
- Be able to select and interpret appropriate laboratory investigations, including microbiology and virology cultures, and understand the significance of results pertaining to all age-groups
- Understand when referral for specialist infectious disease or allergy assessment is appropriate
- Understand the causes of vulnerability to infection
- Understand the classification of infectious agents
- Understand the epidemiology, pathology and 'natural history' of common infections of the newborn and children in Britain and the public health policies associated with them
- Understand the importance of worldwide infections, for example TB, HIV, Malaria, Hepatitis C
- Be able to follow agreed national and local guidelines on the notification of infectious diseases
- Understand the rationale for prescribing common antimicrobials
- Understand the indications for antimicrobial prophylaxis

Common Clinical Disorders:

- Principles and practices of infection control and isolation.
- Common infectious diseases including their epidemiology, etiologic pathogens, pathogenesis, clinical manifestations, differential diagnosis, appropriate application and interpretation of diagnostic tests, treatment and prophylaxis for:
  - a. Respiratory tract infections
  - b. Central nervous system infections
  - c. Cardiovascular infections
  - d. Fungal disease
  - e. Mycobacterial infections
  - f. Approach to the Patient with a Parasitic Infection
  - g. Malaria and Babesiosis
  - h. Soft tissue, bone, and joint infections
  - i. Fevers of unknown origin
  - j. Infections in immunocompromised hosts
  - k. Gastrointestinal tract infections
  - l. Genitourinary tract infections including sexually transmitted diseases.

- m. Infections of indwelling venous and arterial catheters and prosthetic devices
  - n. Nosocomial infections, in intensive care and general care settings
  - o. Animal and human bite wounds.
  - p. HIV infection and its associated complications
  - q. Travel-related infections, diagnosis, treatment, and prevention
  - r. Bioterrorism: identifying infections; understanding public health aspects.
    - i. Bacillus anthracis (Anthrax)
    - ii. Yersinia pestis (Plague)
    - iii. Variola Major (Smallpox)
    - iv. Francisella tularensis (Tularemia)
    - v. Clostridium botulinum (Botulism)
    - vi. Flavi viruses (Ebola, Marburg)
    - vii. Arenaviruses (Lassa)
- Active Immunization against infectious diseases
  - Recommended immunization of infants, children and adolescents.
  - Recommended immunizations for travelers in paediatric age groups.
  - Hypersensitivity tests and desensitization
  - Basic principles of anti-infective therapy, including the use of antibacterial, antiviral, antifungal, anti-mycobacterial, and anti-parasitic agents with regard to mechanisms of action, spectra of activity, doses and regimens, drug interactions, mechanisms of resistance, appropriate clinical applications, and adverse effects/toxicities.

Approach to Common Clinical Presentations:

- Acute onset pyrexia
- Prolonged pyrexia
- Septic shock
- Anaphylaxis
- Abdominal or pelvic pain
- Cellulitis
- Diarrhea
- Dysuria
- Facial or ear pain
- Fever, including fever in immunosuppressed patient
- Hepatitis
- Joint effusion
- Limb, sacral ulcers
- Lymphadenopathy
- Meningitis
- Penile discharge
- Cervicitis, vaginal discharge
- Prevention, public health concerns (immunization, susceptibility and exposure , prophylaxis)
- Productive cough, pulmonary infiltrate
- Rash (cellulitis, erythema, petechiae, purpura, tinea)
- Red eye
- Skin abscess
- Sore throat, painful swallowing

- Vomiting

12. Paediatric Emergency and Critical Care:

- Be able to recognize the patient at risk for an obstructed airway
- Be able to recognize the patient in respiratory failure or arrest
- Be able to formulate a differential diagnosis by age of a patient with acute life threatening respiratory difficulty and prioritize management
- Understand the life-threatening nature of these problems and know when to call for help of more experienced colleagues
- Be able to lead a resuscitation team
- Be able to recognize the child in shock and formulate a differential diagnosis between compensated and uncompensated shock
- Understand the indications, pharmacology, contra indications, dose calculation and routes of administration of drugs used in resuscitation and in the stabilization of children in cardiac arrest or failure
- Be able to obtain venous and arterial access including IV & central lines
- Be able to ensure appropriate non-invasive and invasive monitoring including arterial and end tidal-CO<sub>2</sub>
- Obtain, interpret and react appropriately to blood gas results and blood pressure measurements across a range of emergency presentations in all paediatric age groups
- Understand the prognostic factors for outcome of cardiac resuscitation
- Understand the indications and procedures for transport to a definitive facility following stabilization
- Understand the epidemiology of poisoning and be able to identify the major types of ingestions by age
- Understand and recognize the specific signs and symptoms of poisoning with a range of toxic agents
- Understand the appropriate sequence of investigations in the poisoned child
- Understand the role of antidotes in specific ingestions
- Understand the pharmacology and the treatment of common poisonings
- Understand how to manage the adolescent refusing treatment for a life threatening overdose
- Have the knowledge and skills to be able to assess and manage patients presenting with near-drowning and drowning.
- Understand the key signs of potential life-threatening injury associated with near-drowning and the sequence of appearance of these signs
- Be able to recognize the major types and signs and symptoms of potential life-threatening electrical injuries
- Understand the signs, symptoms and management of life-threatening hyper and hypothermia in children
- Understand the likely types of injury following a fall from a height and a road traffic accident
- Understand and apply the principles of acute trauma life support/advanced paediatric life support
- Be familiar with commonly used equipment, e.g. Cervical immobilization, fluid warmer, body warmer, splintage
- Be aware of the indications for intubation and able to perform the procedure recognizing potential complications

- Be able to distinguish and manage the causes of shock in the trauma patient
- Understand blood product administration in management
- Be able to request and interpret laboratory investigations and x-rays appropriately
- Be aware of child protection and accident prevention issues
- Have developed a sensitivity and understanding regarding the management of chronic end-stage conditions
- Understand the appropriate management of sudden death in infancy and the local management guidelines for supporting the family

Common Clinical Disorders:

- Shock
- Cardio-respiratory arrest
- Respiratory failure
- Congestive cardiac failure
- Acute UTI
- Acute renal failure
- Febrile child
- Status epilepticus
- Head injury
- Spinal injury
- Burns
- Diabetic ketoacidosis
- Fluid and electrolyte disturbances and its therapy
- Acid-base disturbances
- Sepsis
- Poisoning
- Drowning
- Accidents and major trauma
- Scorpion and snake bites

13. Paediatric Immunology and Rheumatology:

- Understand the pathophysiology and principles of treatment of allergic and autoimmune disorders
- Understand the prevention, diagnosis, and management of crystalline diseases, systemic rheumatic diseases, spondyloarthropathies, vasculitis, inflammatory muscle disease, rickets, recreational and sports injury and soft-tissue diseases and trauma.
- The goal is early diagnosis and treatment of these conditions as well as management of acute arthritis and musculoskeletal disorders and in the long-term care of systemic disorders to prevent disability and death.
- Understand the likely types of soft tissue and bony injuries for each age group
- Be able to judge if these relate correctly to the stated mechanism of injury
- Be aware of rheumatological, infectious, malignant and non-accidental causes of musculoskeletal presentations
- Be able to examine a child in a way which localizes the injury
- Be able to manage and score pain appropriately

- Be able to request and interpret x-rays appropriately
- Understand the Salter-Harris classification of epiphyseal injuries
- Understand when referral to physiotherapy would be of benefit
- Understand the likely time-frame for recovery in children
- Be able to arrange appropriate follow-up at a sensible time
- Resident must also be proficient in monitoring the effects of anti inflammatory, immunosuppressive, and cytotoxic drugs

Common Clinical Disorders:

- Arthritis (acute and chronic)
- Major congenital orthopedic deformities
- Bone and joint infections; Pyogenic, tubercular
- Common bone tumors.
- Connective tissue disorders
- Disorders of immunoglobulins
- T and B cell disorders
- Immunodeficiency syndromes.

Approach to Common Clinical Presentations:

- Arthritis
- Joint pain and/or swelling (acute or chronic, monoarticular or polyarticular)
- Non-traumatic back pain in children
- Muscle aches (localized or diffuse)
- Musculoskeletal weakness
- Nonarticular signs and symptoms of rheumatologic disease, Raynaud's phenomenon and skin rash
- Regional pain of the neck, shoulder, lower back, hip, knee, wrists hands, or
- Traumatic joint
- Multiple congenital anomalies

14. Paediatric Otolaryngology:

- Have the understanding and skills to be able to assess and manage children presenting with ENT problems
- Be able to formulate a differential diagnosis
- Understand the life-threatening nature of some of these conditions
- Understand and recognize the possible respiratory complications of other system disorders
- Be able to select and interpret appropriate respiratory investigations including arterial blood gases, chest x- rays and peak flow measurements
- Understand when referral for specialist paediatric respiratory assessment is appropriate

Common Clinical Disorders:

- Acute and chronic otitis media
- Conductive/sensorineural hearing loss
- Post-diphtheritic palatal palsy
- Acute/chronic tonsillitis/adenoids

- Allergic rhinitis/sinusitis
- Foreign body.

Approach to Common Clinical Presentations:

- Traumatic ear conditions
- Earache or discharge
- Hearing loss
- Epistaxis
- Nasal trauma
- Acute tonsillitis and pharyngitis
- Airway obstruction
- Dental conditions
- Referred otalgia

15. Paediatric Dermatology:

- Have the knowledge and skills to be able to assess and manage children presenting with dermatological disorders
- Be able to describe accurately any rash
- Be able to formulate a differential diagnosis
- Recognize and manage the serious as well as the life-threatening complications of some of these conditions
- Understand and recognize the possible dermatological manifestations and complications of other system disorders
- Understand when referral for specialist dermatological opinion is appropriate
- Understand the principles of therapy for skin complaints

Common Clinical Disorders:

- Exanthematous illnesses
- Vascular lesions
- Pigment disorders
- Vesicobullous disorders
- Pyogenic, fungal and parasitic infections
- Steven-Johnson syndrome
- Eczema
- Seborrheic dermatitis
- Drug rash
- Urticaria
- Alopecia
- Ichthyosis

16. Paediatric Ophthalmology:

- Have the knowledge and skills to be able to assess and manage children presenting with ophthalmological problems
- Be able to select and interpret appropriate ophthalmological investigations including Snellen charts and visual field examinations
- Understand when referral for specialist paediatric ophthalmological assessment is appropriate

Common Clinical Disorders:

- Errors of refraction and accommodation
- Astigmatism
- Partial/total loss of vision
- Nystagmus
- Cataract
- Night blindness
- Chorio-retinitis
- Strabismus
- Conjunctival and corneal disorders
- Retinopathy of pre-maturity
- Retinoblastoma
- Optic atrophy
- Papilledema.

Approach to Common Clinical Presentations:

- Refractory errors
- Blindness
- Redness
- Eye discharge
- Conjunctivitis
- Squint
- Proptosis

17. Paediatric Psychiatry:

- Understand normal behaviour patterns including response to injury and illness from birth to adolescence
- Understand the signs and symptoms that indicate serious conditions such as depression and psychosis
- Understand about attachment and conduct disorders
- Be able to recognize abnormal child behaviour patterns
- Understand the influence of physical, emotional and social factors on development and health
- Understand about excessive crying and resources available to help families
- Understand about the roles of other professions, agencies and the voluntary sector
- Understand the emotional impact of hospitalization on children
- Understand the behaviour aspects of eating disorders
- Be able to recognize fabricated illness and injury in children
- Understand adolescent behaviour in maturation
- Be able to recognize, support and manage patients presenting with self harm
- Understand about the multi-disciplinary nature of child and adolescent mental health services

Common Clinical Disorders:

- Rumination
- Pica, enuresis
- Encopresis
- Sleep disorders

- Habit disorders
- Breath holding spells
- Anxiety disorders
- Mood disorders
- Temper tantrums
- Attention deficit
- Hyperactivity disorder
- Infantile autism

Approach to Common Clinical Presentations:

- Self harm
- Habit disorders
- Hyperactivity and attention deficit
- Expression of distress
- Unnecessary shouting, crying
- Abnormally under reacting
- Apnoeic episodes
- Presentation of imposed airway obstruction

18. Paediatric Genetics:

Common Clinical Disorders:

- Principles of inheritance
- Pedigree drawing
- Chromosomal disorders
- Single gene disorders
- Multifactorial/polygenic disorders
- Genetic diagnosis and prenatal diagnosis.

19. Community and Social Pediatrics:

- National health programs related to child health
- National health nutrition programs
- Nutrition screening of community
- Prevention of blindness
- School health programs
- Child abuse and neglect
- Disability and rehabilitation
- Prevention of sexually transmitted diseases
- Contraception
- Health legislation
- National policy on children, adolescence, adoption, child labor, juvenile delinquency etc.
- Government and non-government support services for children
- Investigation of adverse events following immunization in the community
- General principles of prevention and control of infections including food borne, waterborne, soil borne and vector borne diseases
- Investigation of an outbreak in a community



## Skills & Procedures

By the end of subspecialty training, trainees will:

- Understand the appropriate relevant anatomical markers, indications, contraindications and complications of procedures commonly used in the Paediatrics.
- Understand local and national guidelines for obtaining informed consent
- Understand local guidelines for providing sedation and pain relief
- Understand and practice scrupulous aseptic techniques
- Be able to interpret results and undertake a management plan accordingly
- Be able to record results and document procedures legibly and accurately
- Understand age-appropriate normal ranges of tests commonly requested in the Department setting
- Understand the positive and negative predictive value of commonly performed tests
- Be able to explain investigation results to caregivers and/or the patient
- Be able to enlist the help of play therapists and nursing staff in order to attempt to reduce the anxiety of a child and caregivers

History and Examination.

- History taking including psychosocial history
- Physical examination including fundus examination
- Newborn examination
- Gestation assessment
- Thermal protection of young infants
- Nutritional anthropometry and its assessment
- Assessment of growth, use of growth chart
- SMR rating
- Developmental evaluation
- Communication with children, parents, health functionaries and social support groups
- Genetic counseling.

Monitoring Skills:

- Temperature recording
- Capillary blood sampling
- Peripheral Arterial blood sampling
- Pulse oximetry
- Capnography and end tidal CO<sub>2</sub> recording
- Measurement of peak flow

Therapeutic Skills:

- Hydrotherapy
- Nasogastric feeding
- Endotracheal intubation
- Cardiopulmonary resuscitation (pediatric and neonatal)
- Administration of oxygen
- Venepuncture and establishment of vascular access

- Collection of blood from central lines
- Umbilical venous cannulation and sampling
- Administration of fluids, blood, blood components
- Parenteral nutrition
- Intraosseous fluid administration
- Intrathecal administration of drugs
- Saphenous vein cut down
- Common dressings
- Abscess drainage and basic principles of rehabilitation.

#### Acute Life Support/Resuscitation procedures

- Manual airway clearance manouevres
- Airway insertion
- Orotracheal and nasotracheal intubation
- Mechanical ventilation
- Use of continuous positive airways pressure
- Replacement of tracheostomy tube
- Cricothyrotomy and percutaneous transtracheal ventilation
- Needle thoracentesis
- Tube thoracotomy
- Direct current electrical cardioversion defibrillation
- External cardiac pacing
- Pericardiocentesis

#### Investigative Skills:

- Lumbar puncture
- Ventricular tap
- Bone marrow aspiration
- Pleural, peritoneal, pericardial and subdural tap
- Biopsy of liver and kidney
- Collection of urine for culture
- Urethral catheterization
- Supra-pubic aspiration.

#### Gastrointestinal Procedures

- Oronasogastric tube replacement
- Gastrostomy tube replacement
- Gastric lavage

#### Neurological Procedures

- Lumbar puncture
- Ventriculo peritoneal shunt tap (VP)

#### Ophthalmic Procedures

- Conjunctival irrigation
- Contact lens removal
- Eversion of eyelids

#### Pain Relief and Sedation

- Pain scoring

- Nonpharmacologic measures
- Pharmacologic approaches
- Local anaesthetics
- Regional nerve blocks
- Procedural sedation techniques

Bedside Investigations:

- Hemoglobin
- TLC
- ESR
- Peripheral smear staining and examination
- Urine: routine and microscopic examination
- Stool microscopy including hanging drop preparation
- Examination of CSF and other body fluids
- Gram stain, ZN stain
- Shake test on gastric aspirate.

Bedside Interpretation:

- X-rays of chest, abdomen, bone and head
- ECG
- ABG findings
- CT scan.
- Common EEG patterns
- Audiograms
- Ultrasonographic abnormalities and isotope studies.

## **RESEARCH/ THESIS WRITING**

### **RESEARCH/ THESIS WRITING**

Total of one year will be allocated for work on a research project with thesis writing. Project must be completed and thesis be submitted before the end of training. Research can be done as one block in 5<sup>th</sup> year of training or it can be stretched over five years of training in the form of regular periodic rotations during the course as long as total research time is equivalent to one calendar year.

### **Research Experience**

The active research component program must ensure meaningful, supervised research experience with appropriate protected time for each resident while maintaining the essential clinical experience. Recent productivity by the program faculty and by the residents will be required, including publications in peer-reviewed journals. Residents must learn the design and interpretation of research studies, responsible use of informed consent, and research methodology and interpretation of data. The program must provide instruction in the critical assessment of new therapies and of the surgical literature. Residents should be advised and supervised by qualified staff members in the conduct of research.

### **Clinical Research**

Each resident will participate in at least one clinical research study to become familiar with:

1. Research design
2. Research involving human subjects including informed consent and operations of the Institutional Review Board and ethics of human experimentation
3. Data collection and data analysis
4. Research ethics and honesty
5. Peer review process

This usually is done during the consultation and outpatient clinic rotations.

### **Case Studies or Literature Reviews**

Each resident will write, and submit for publication in a peer-reviewed journal, a case study or literature review on a topic of his/her choice.

### **Laboratory Research**

#### ***Bench Research***

Participation in laboratory research is at the option of the resident and may be arranged through any faculty member of the Division. When appropriate, the research may be done at other institutions.

#### ***Research involving animals***

Each resident participating in research involving animals is required to:

1. Become familiar with the pertinent Rules and Regulations of the University of Health Sciences Lahore i.e. those relating to "Health and

Medical Surveillance Program for Laboratory Animal Care Personnel" and "Care and Use of Vertebrate Animals as Subjects in Research and Teaching"

2. Read the "Guide for the Care and Use of Laboratory Animals"
3. View the videotape of the symposium on Humane Animal Care

***Research involving Radioactivity***

Each resident participating in research involving radioactive materials is required to

1. Attend a Radiation Review session
2. Work with an Authorized User and receive appropriate instruction from him/her.

## METHODS OF INSTRUCTION/COURSE CONDUCTION

As a policy, active participation of students at all levels will be encouraged.

Following teaching modalities will be employed:

1. Lectures
2. Seminar Presentation and Journal Club Presentations
3. Group Discussions
4. Grand Rounds
5. Clinico-pathological Conferences
6. SEQ as assignments on the content areas
7. Skill teaching in ICU, emergency and ward settings
8. Attend genetic clinics and rounds for at least one month.
9. Attend sessions of genetic counseling
10. Self study, assignments and use of internet
11. Bedside teaching rounds in ward
12. OPD & Follow up clinics
13. Long and short case presentations

In addition to the conventional teaching methodologies interactive strategies like conferences will also be introduced to improve both communication and clinical skills in the upcoming consultants. Conferences must be conducted regularly as scheduled and attended by all available faculty and residents. Residents must actively request autopsies and participate in formal review of gross and microscopic pathological material from patients who have been under their care. It is essential that residents participate in planning and in conducting conferences.

### **1. Clinical Case Conference**

Each resident will be responsible for at least one clinical case conference each month. The cases discussed may be those seen on either the consultation or clinic service or during rotations in specialty areas. The resident, with the advice of the Attending Physician on the Consultation Service, will prepare and present the case(s) and review the relevant literature.

### **2. Monthly Student Meetings**

Each affiliated medical college approved to conduct training for MD Paediatrics will provide a room for student meetings/discussions such as:

- a. Journal Club Meeting
- b. Core Curriculum Meetings
- c. Skill Development

#### ***a. Journal Club Meeting***

A resident will be assigned to present, in depth, a research article or topic of his/her choice of actual or potential broad interest and/or application. Two hours per month should be allocated to discussion of any current articles or topics introduced by any participant. Faculty or outside researchers will be invited to present outlines or results of current research activities. The article should be critically evaluated and its applicable results should be highlighted, which can be incorporated in clinical practice. Record of all such articles should be maintained in the relevant department.

***b. Core Curriculum Meetings***

All the core topics of Paediatrics should be thoroughly discussed during these sessions. The duration of each session should be at least two hours once a month. It should be chaired by the chief resident (elected by the residents of the relevant discipline). Each resident should be given an opportunity to brainstorm all topics included in the course and to generate new ideas regarding the improvement of the course structure

***c. Skill Development***

Two hours twice a month should be assigned for learning and practicing clinical skills.

**List of skills to be learnt during these sessions is as follows:**

1. Residents must develop a comprehensive understanding of the indications, contraindications, limitations, complications, techniques, and interpretation of results of those technical procedures integral to the discipline (mentioned in pg. 10).
2. Residents must acquire knowledge of and skill in educating patients about the technique, rationale and ramifications of procedures and in obtaining procedure-specific informed consent. Faculty supervision of residents in their performance is required, and each resident's experience in such procedures must be documented by the program director.
3. Residents must have instruction in the evaluation of medical literature, clinical epidemiology, clinical study design, relative and absolute risks of disease, medical statistics and medical decision-making.
4. Training must include cultural, social, family, behavioral and economic issues, such as confidentiality of information, indications for life support systems, and allocation of limited resources.
5. Residents must be taught the social and economic impact of their decisions on patients, the primary care physician and society. This can be achieved by attending the bioethics lectures and becoming familiar with Project Professionalism Manual such as that of the American Board of Internal Medicine.
6. Residents should have instruction and experience with patient counseling skills and community education.

7. This training should emphasize effective communication techniques for diverse populations, as well as organizational resources useful for patient and community education.
8. Residents may attend the series of lectures on Nuclear Medicine procedures (radionuclide scanning and localization tests and therapy) presented to the Radiology residents.
10. Residents should have experience in the performance of clinical laboratory and radionuclide studies and basic laboratory techniques, including quality control, quality assurance and proficiency standards.
11. Each resident will observe and participate in each of the following procedures, preferably done on patients firstly under supervision and then independently (pg.12-13)

### **3. Annual Grand Meeting**

Once a year all residents enrolled for MD Paediatrics should be invited to the annual meeting at UHS Lahore.

One full day will be allocated to this event. All the chief residents from affiliated institutes will present their annual reports. Issues and concerns related to their relevant courses will be discussed. Feedback should be collected and suggestions should be sought in order to involve residents in decision making.

The research work done by residents and their literary work may be displayed.

In the evening an informal gathering and dinner can be arranged. This will help in creating a sense of belonging and ownership among students and the faculty.



Curriculum/Statutes & Regulations -MD Paediatrics  
**LOG BOOK**

The residents must maintain a log book and get it signed regularly by the supervisor. A complete and duly certified log book should be part of the requirement to sit for MD examination. Log book should include adequate number of diagnostic and therapeutic procedures observed and performed, the indications for the procedure, any complications and the interpretation of the results, routine and emergency management of patients, case presentations in CPCs, journal club meetings and literature review.

**Proposed Format of Log Book is as follows:**

Candidate's Name: -----

Supervisor -----

Roll No. -----

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

Residents should become proficient in performing the related procedures (pg.12,13,46,47). After observing the technique, they will be observed while performing the procedure and, when deemed competent by the supervising physician, will perform it independently. They will be responsible for obtaining informed consent, performing the procedure, reviewing the results with the pathologist and the attending physician and informing the patient and, where appropriate, the referring physician of the results.

**Procedures Performed**

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

**Paediatric Emergencies Handled**

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

**Case Presented**

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

**Seminar/Journal Club Presentation**

Sr.#	Date	Topic	Supervisor's Signature
1			
2			
3			
4			

**Evaluation Record**

(Excellent, Good, Adequate, Inadequate, Poor)

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

Sr.#	Date	Method of Evaluation (Oral, Practical, Theory)	Rating	Supervisor's Signature
1				
2				

## **EVALUATION & ASSESSMENT STRATEGIES**

### **Assessment**

It will consist of action and professional growth oriented *student-centered integrated assessment* with an additional component of *informal internal assessment, formative assessment* and measurement-based *summative assessment*.

### **Student-Centered Integrated Assessment**

It views students as decision-makers in need of information about their own performance. Integrated Assessment is meant to give students responsibility for deciding what to evaluate, as well as how to evaluate it, encourages students to own the evaluation and to use it as a basis for self-improvement. Therefore, it tends to be growth-oriented, student-controlled, collaborative, dynamic, contextualized, informal, flexible and action-oriented.

In the proposed curriculum, it will be based on:

- Self Assessment by the student
- Peer Assessment
- Informal Internal Assessment by the Faculty

### ***Self Assessment by the Student***

Each student will be provided with a pre-designed self-assessment form to evaluate his/her level of comfort and competency in dealing with different relevant clinical situations. It will be the responsibility of the student to correctly identify his/her areas of weakness and to take appropriate measures to address those weaknesses.

### ***Peer Assessment***

The students will also be expected to evaluate their peers after the monthly small group meeting. These should be followed by a constructive feedback according to the prescribed guidelines and should be non-judgmental in nature. This will enable students to become good mentors in future.

### ***Informal Internal Assessment by the Faculty***

There will be no formal allocation of marks for the component of Internal Assessment so that students are willing to confront their weaknesses rather than hiding them from their instructors.

It will include:

- a. Punctuality

- b. Ward work
- c. Monthly assessment (written tests to indicate particular areas of weaknesses)
- d. Participation in interactive sessions

### **Formative Assessment**

Will help to improve the existing instructional methods and the curriculum in use

#### ***Feedback to the faculty by the students:***

After every three months students will be providing a written feedback regarding their course components and teaching methods. This will help to identify strengths and weaknesses of the relevant course, faculty members and to ascertain areas for further improvement.

### **Summative Assessment**

It will be carried out at the end of the programme to empirically evaluate cognitive, psychomotor and affective domains in order to award degrees for successful completion of courses.

**MD PAEDIATRICS EXAMINATIONS****Part I MD Paediatrics****Total Marks: 200**

All candidates admitted in MD Paediatrics course shall appear in Part I examination at the end of first calendar year.

**Components of Part-I Examination:**

Paper-I, 100 MCQs (single best, having one mark each) 100 Marks

Paper-II, 10 SEQs (having 10 marks each) 100 Marks

**Topics included in paper:**

	<b>Paper-I</b>	<b>Paper-II</b>
1. Anatomy	(20 MCQs)	(2 SEQs)
2. Physiology	(20 MCQs)	(2 SEQs)
3. Pathology	(20 MCQs)	(2 SEQs)
4. Biochemistry	(15 MCQs)	(1 SEQs)
5. Pharmacology	(10 MCQs)	(1 SEQ)
6. Behavioural Sciences	(10 MCQs)	(1 SEQ)
7. Biostatistics & Research Methodology	(05 MCQs)	(1 SEQ)

**Part II MD Paediatrics****Total Marks: 430**

All candidates admitted in MD Paediatrics course shall appear in Part II examination at the end of 2<sup>nd</sup> calendar year.

There shall be two written papers of 100 marks each, Oral & practical/clinical examination of 150 marks and log book assessment of 80 marks.

**Topics included in paper 1**

Principles of internal medicine including;

1. Pulmonary Medicine	(10 MCQs)
2. Allergy and Immunology	(10 MCQs)
3. Cardiovascular Illness	(10 MCQs)
4. Diabetes & Endocrinology	(10 MCQs)
5. Infectious Disease	(10 MCQs)

**Topics included in paper 2**

Principles of internal medicine including;

1. Gastroenterology & Hepatology	(10 MCQs)
2. Neurology	(10 MCQs)

- |                          |           |
|--------------------------|-----------|
| 3. Hematology & Oncology | (10 MCQs) |
| 4. Nephrology            | (10 MCQs) |
| 5. Rheumatology          | (10 MCQs) |

## Components of Part II Examination

### Theory:

<b>Paper 1:</b>	<b><u>100 Marks</u></b>	<b>3 Hours</b>
10 SEQs (No Choice; 05 marks each)	50 Marks	
50 MCQs	50 Marks	
<b>Paper 2:</b>	<b><u>100 Marks</u></b>	<b>3 Hours</b>
10 SEQs (No Choice; 05 marks each)	50 Marks	
50 MCQs	50 Marks	

Only those candidates, who pass in theory papers, will be eligible to appear in the Oral & Practical/Clinical Examination.

Oral & practical/clinical examination shall be held in basic clinical techniques relevant to internal medicine.

### OSCE **50 Marks**

10 stations each carrying 05 marks of 10 minutes duration; each evaluating performance based assessment with five of them interactive

### Clinical **100 Marks**

Four short cases (15 marks each)	60 Marks
One long case:	40 Marks

### Log Book **80 Marks**

**Part III MD Paediatrics****Total Marks: 920**

All candidates admitted in MD course shall appear in Part-III examination at the end of structured training programme (end of 5th calendar year and after clearing Part I & II examinations).

There shall be two written papers of 150 marks each, Oral & Practical/ Clinical examination of 300 marks, log book assessment of 120 marks and thesis examination of 200 marks.

**Topics included in paper 1**

- |  |           |
|--|-----------|
| 1. Growth and Development, Neonatology     | (15 MCQs) |
| 2. Pediatric Cardiology & Pulmonology      | (10 MCQs) |
| 3. Pediatric Gastroenterology & Hepatology | (10 MCQs) |
| 4. Pediatric Hematology & Oncology         | (10 MCQs) |
| 5. Pediatric Neurology                     | (10 MCQs) |
| 6. Pediatric Endocrinology                 | (10 MCQs) |
| 7. Pediatric Emergency & Critical care     | (10 MCQs) |

**Topics included in paper 2**

- |   |           |
|---|-----------|
| 1. Pediatric Infectious Diseases            | (15 MCQs) |
| 2. Pediatric Neurology                      | (10 MCQs) |
| 3. Pediatric Rheumatology                   | (10 MCQs) |
| 4. Pediatric Psychiatry                     | (10 MCQs) |
| 5. Pediatric Genetics                       | (10 MCQs) |
| 6. Pediatric Ophthalmology & Otolaryngology | (10 MCQs) |
| 7. Community & Social Pediatrics            | (10 MCQs) |

**Components of Part III Examination****Theory**

<b>Paper I</b>	<b><u>150 Marks</u></b>	<b>3 Hours</b>
15 SEQs (No Choice)	75 Marks	
75 MCQs	75 Marks	
<b>Paper II</b>	<b><u>150 Marks</u></b>	<b>3 Hours</b>
15 SEQs (No Choice)	75 Marks	
75 MCQs	75 Marks	

The candidates, who pass in theory papers, will be eligible to appear in the clinical & viva voce.

**OSCE/ Viva**

**100 Marks**

10 stations each carrying 10 marks of 10 minutes duration; each evaluating performance based assessment with five of them interactive

**Clinical**

**200 Marks**

Four short cases (each 25 marks)

100 Marks

One long case

100 Marks

**Log Book**

**120 Marks**

**Thesis Examination**

**200 Marks**

All candidates admitted in MD courses shall appear in Part-III thesis examination at the end of 5<sup>th</sup> calendar year of the MD programme and not later than 8th calendar year of enrolment. The examination shall include thesis evaluation with defense.