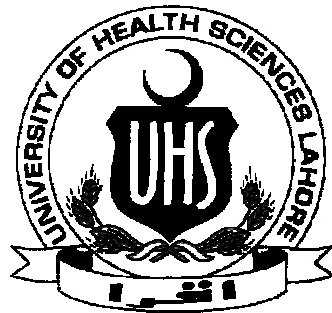

**CURRICULUM/STATUTES & REGULATIONS
FOR
5 YEARS DEGREE PROGRAMME
IN
GASTROENTEROLOGY
(MD GASTROENTEROLOGY)**



**UNIVERSITY OF HEALTH SCIENCES,
LAHORE**

STATUTES

1. Nomenclature Of The Proposed Course

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

2. Course Title:

MD Gastroenterology

3. Training Centers

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

4. Duration of Course

The duration of MD Gastroenterology 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 1st 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 1st day of enrollment.

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

Part III is structured for 3rd, 4th and 5th calendar years in MD Gastroenterology. The candidate shall undergo training to achieve educational objectives of MD Gastroenterology (knowledge & skills) along with rotation in

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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 5th 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 Gastroenterology course, the candidate shall be required to have:

- MBBS degree
- Completed one year House Job
- One year experience in Gastroenterology/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, 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 Gastroenterology 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 Gastroenterology is to train residents to acquire the competency of a specialist in the field of Gastroenterology so that they can become good teachers, researchers and clinicians in their specialty after completion of their training.

GENERAL OBJECTIVES

MD Gastroenterology training should enable a student to:

- Access and apply relevant knowledge to clinical practice:
 - Maintain currency of knowledge
 - Apply scientific knowledge in practice
 - Appropriate to patient need and context
 - Critically evaluate new technology
- Safely and effectively performs appropriate clinical skills & procedures:
 - Consistently demonstrate sound clinical skills
 - Demonstrate procedural knowledge and technical skill at a level appropriate to the level of training
 - Demonstrate manual dexterity required to carry out procedures
 - Adapt their skills in the context of each patient and procedure
 - Maintain and acquire new skills
 - Approach and carries out procedures with due attention to safety of patient, self and others
 - Critically analyze their own clinical performance for continuous improvement
- Design and implement effective management plans:
 - Recognize the clinical features, accurately diagnose and manage gastroenteric problems
 - Formulate a well-reasoned provisional diagnosis and management plan based on a thorough history and examination
 - Formulate a differential diagnosis based on investigative findings

- Manage patients in ways that demonstrate sensitivity to their physical, social, cultural and psychological needs
- Recognize disorders of the Gastroenterological system and differentiate those amenable to medical treatment
- Effectively recognize and manage complications
- Accurately identify the benefits, risks and mechanisms of action of current and evolving treatment modalities
- Indicate alternatives in the process of interpreting investigations and in decision-making
- Manage complexity and uncertainty
- Consider all issues relevant to the patient
- Identify risk
- Assess and implement a risk management plan
- Critically evaluate and integrate new technologies and techniques.
- Organize diagnostic testing, imaging and consultation as needed:
 - Select medically appropriate investigative tools and monitoring techniques in a cost-effective and useful manner
 - Appraise and interpret appropriate diagnostic imaging and investigations according to patients' needs
 - Critically evaluates the advantages and disadvantages of different investigative modalities
- Communicate effectively:
 - Communicate appropriate information to patients (and their family) about procedures, potentialities and risks associated, in ways that encourage their participation in informed decision making
 - Communicate with the patient (and their family) the treatment options including benefits and risks of each
 - Communicate with and co-ordinate health management teams to achieve an optimal patient management
 - Initiate the resolution of misunderstandings or disputes
 - Modify communication to accommodate cultural and linguistic sensitivities of the patient

- Recognize the value of knowledge and research and its application to clinical practice:
 - Assume responsibility for self-directed learning
 - Critically appraise new trends in Gastroenterology
 - Facilitate the learning of others
- Appreciate ethical issues associated with Gastroenterology:
 - Consistently apply ethical principles
 - Identify ethical expectations that impact on medico-legal issues
 - Recognize the current legal aspects of informed consent and confidentiality
 - Be accountable for the management of their patients.
- Professionalism by:
 - Employing a critically reflective approach to Gastroenterology
 - Adhering with current regulations concerning workplace harassment
 - Regularly carrying out self and peer reviewed audit
 - Acknowledging and have insight into their own limitations
 - Acknowledging and learning from mistakes
- Work in collaboration with members of an interdisciplinary team where appropriate:
 - Collaborate with other professionals in the selection and use of various types of treatments assessing and weighing the indications and contraindications associated with each type
 - Develop a care plan for a patient in collaboration with members of an interdisciplinary team
 - Employ a consultative approach with colleagues and other professionals
 - Recognize the need to refer patients to other professionals.
- Management and Leadership
 - Effective use of resources to balance patient care and system resources
 - Identify and differentiate between system resources and patient needs
 - Prioritize needs and demands dealing with limited system resources.
 - Manage and lead clinical teams
 - Recognize the importance of different types of expertise which contribute to the effective functioning of clinical team

- Maintain clinically relevant and accurate contemporaneous records
- Health advocacy:
 - Promote health maintenance of patients
 - Advocate for appropriate health resource allocation

SPECIFIC LEARNING OUTCOMES

Residents completing MD Gastroenterology training will have formal instruction, clinical experience, and will be able to demonstrate competence in the evaluation and management of adult and paediatric patients and applying scientific principles for the identification, prevention, treatment and rehabilitation of following acute and chronic disorders in Gastroenterology.

Esophagus

- Reflux Disorders
- Medical and Surgical Management of Reflux
- Barrett's Esophagus
- Dysplasia and endoscopic management
- Rumination syndrome, belching, aerophagia, Hiccoughs evaluation

Acid peptic disorders of the gastrointestinal tract

- Peptic ulcer disease and H. Pylori
- Non-ulcer dyspepsia
- NSAID in the pathogenesis of gastroduodenal ulcers and their complications
- Gastroparesis and post- surgical gastric issues

Motor disorders of the gastrointestinal tract

- Achalasia, diffuse esophageal spasm and other spastic disorders, non-cardiac chest pain, intestinal pseudo-obstruction and scleroderma

Other Stomach Conditions

- Gastric Polyps
- Gastric Carcinoids

Irritable bowel syndrome and Functional GI disorders

- Disorders of nutrient assimilation/malnutrition

Inflammatory bowel diseases (IBD)

- Diagnosis and management
- Immunomodulators and biologic therapy for IBD, advancements
- Post surgical management of IBD
- Complications of IBD / surgical complications and management
- Serologic markers and drug metabolite in IBD issues in surveillance and management of dysplasia in IBD

Colonic Disease

- Colon cancer and screening
- Polyp surveillance, malignant polyps/serrated adenomas
- Constipation, pelvic floor dysfunction, evaluation and management
- Diverticular disease and complications/diverticulitis
- Endoscopic resection of colorectal polyps, guidelines and management
- Familial colorectal cancer
- Evidence based guidelines for cancer management and guidelines

Other small bowel and colonic diseases

- Short gut syndrome
- Small bowel bacterial overgrowth syndrome
- Non specific colitis
- Radiation colitis and enteritis

- Solitary rectal ulcer syndrome
- Diversion colitis
- Graft vs host disease

Vascular disorders of the gastrointestinal tract

- Mesenteric ischemia
- Acute ischemic colitis/chronic mesenteric ischemia
- Portal venous thrombosis

Gastrointestinal infections

- Retroviral, mycotic, and parasitic diseases
- Clostridium difficile infection and management of recurrent disease

Gastrointestinal diseases with an immune basis

- Celiac sprue
- Eosinophilic GI disorder/allergic GI disorder
- GI involvement in autoimmune disorders

Gastrointestinal neoplastic disease

- Tumor biology
- Neuroendocrine tumors
- Gastrointestinal lymphoma
- Anal canal cancer
- Chemotherapy and radiation treatment for GI malignancies
- Familial risk of gastric/esophageal cancer
- GI stromal tumors
- HIV related malignancy

Hepatology

- Acute viral hepatitis
- Alcoholic liver disease
- Non-alcoholic fatty liver disease
- Fulminant hepatic failure
- Chronic viral hepatitis
- HBV resistance
- Treatment of viral hepatitis (B and C)
- Spontaneous bacterial peritonitis and hepatorenal syndrome in liver failure
- Management of complications of liver disease
- Drug and toxin induced liver disease
- Pregnancy related hepatobiliary disease
- Cholestatic syndromes (Primary sclerosing cholangitis/primary biliary cirrhosis etc)
- Genetic liver diseases (hemochromatosis, alpha-1 antitrypsin deficiency, Wilson's disease)
- Complication of chronic liver disease
- Autoimmune liver diseases
- Vascular disorders of liver (Budd-Chiari and ischemic/hypoxic hepatitis)
- Perioperative evaluation and management of liver disease patient
- Pre-transplant evaluation
- Management and evaluation of post-transplant patients
- Hepatocellular carcinoma/other hepatic malignancy
- Liver imaging modalities

Pancreatic Diseases;

- Acute pancreatitis

- Chronic pancreatitis
- Pancreatic function studies
- Idiopathic pancreatitis
- Nutritional support in acute and chronic pancreatitis
- Radiologic evaluation of pancreas and biliary tract
- Biliary dyskinesia/sphincter of Oddi dysfunction
- Pancreatic divisum
- Molecular genetic of hereditary pancreatic disorders
- Pancreatic cancer

Biliary Diseases

- Abdominal pain and evaluation
- Gall stone disease and acute cholecystitis (calculous and acalculous)
- Neoplastic diseases of the gallbladder and bile ducts

Pediatric Gastroenterology

- IBD issues in pediatric population
- Neonatal jaundice, and cholestasis
- Common pediatric gastrointestinal problems:
 - Abdominal pain, constipation, diarrhea, cystic fibrosis necrotizing enterocolitis, Meckel's diverticulum, intestinal intussusception, and mid-gut volvulus
- GI complications of malignancy and treatment
- Rickets and other systemic disorders in GI and liver diseases

Geriatric gastroenterology

- Endoscopic gastrostomy tube risks and complications
- Evaluation and risks of endoscopic procedures among elderly
- Effect of aging on gastrointestinal tract and common GI illness among elderly population

Gastrointestinal bleeding

- Upper GI bleeding
- Non variceal GI bleeding and management
- Variceal bleeding and management
- Lower GI bleeding and management
- GI bleeding of obscure origin, evaluation and management (including arteriovenous malformations)

Genetic/inherited disorders

- Genetic marker in Crohn's disease

Advance Endoscopic Technique

- Capsule endoscopy
- Double balloon enteroscopy, single fiber endoscopy, narrow band imaging and confocal (high magnification endoscopy)
- Anticoagulants and antiplatelet agents and GI endoscopy
- Complications of endoscopic procedures

Anal canal diseases/disorder

- Hemorrhoids and anal fissure
- Anal canal benign and malignant diseases
- Fecal incontinence and evaluation, fecal impaction

Foreign body management

Other Topics

- Gastrointestinal and biliary manifestations of HIV infections

- Systemic Diseases affecting GI and liver, including para-neoplastic disorders

Management of GI emergencies in the acutely ill patient including ileus

Advance Imaging Techniques in GI/Liver

- CT Colonography
- CT enterography
- PET Scan

Nutrition

- Nutritional issues in patients with IBD

Techniques used in the basic investigation of gastrointestinal cancer

- Flow cytometry
- Polymerase chain reaction assays
- Mutation analysis
- Methylation assays
- DNA sequencing and linkage analysis

Professional Skills:

Residents shall learn professional skills in:

- Patient Management including eliciting pertinent history, performing physical examination, ordering and interpreting the result of appropriate investigations and thereby deciding and implementing appropriate treatment plan by maintaining follow up
- Psychosocial and emotional effects of acute and chronic illness on patients and their families
- Management of end of life issues and palliative care
- Quality improvement and patient safety activities

Procedural and Technical Skills:

Residents shall learn technical and procedural skills in:

- Blood sample collection - venepuncture and finger prick methods of sample collection, use of different types of anticoagulants, containers and the effects of delay in processing and storage.
- Trainees should have knowledge of the indications, results and methods for:
 - Breath testing for H pylori, bacterial overgrowth
 - Oesophageal and rectal manometry and pH testing
 - Gastric secretory tests
 - Tests for gut absorption and inflammation
 - Radiological evaluation of the GI tract
 - Liver function tests
 - Intestinal biopsy
 - Liver biopsy
 - Paracentesis
- Endoscopic procedures: Upper GI endoscopy including esophagogastro-duodenoscopy
- Endoscopic therapy of benign and malignant oesophageal strictures
- Thermal therapy of gastro-oesophageal tumours, ulcers and vascular malformations
- Direct injection/banding techniques for bleeding lesions and tumour
- Enteroscopy

- Flexible sigmoidoscopy
- ERCP ; Therapeutic
- Diagnostic total colonoscopy
- Colonoscopic therapy of benign and malignant tumours and strictures
- Review of normal and abnormal blood films with emphasis on morphology of red cells, white cells and platelets.
- Familiarization with cytogenetics, understanding the principles of cytogenetics and appreciating the relevance and significance of chromosomes in diagnostic hematology and Gastroenterology
- Understanding the principles involved in the molecular diagnosis of Gastroenteric disorders by
 - Flow cytometry
 - PCR
 - FISH
 - Western and Southern Blotting.
 - Microarray technology
- Interpretation of imaging techniques commonly employed in the evaluation of patients with critical illness
- Practice infection control procedures and perform continuous quality improvement.

Curriculum/Statutes & Regulations -MD Gastroenterology
REGULATIONS

1. Scheme of the Course

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

Course Structure	Components	Examination
Part I	<p>Basic medical sciences</p> <p>Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Behavioural Sciences and Biostatistics & Research Methodology</p>	<p>Part-I examination at the end of 1st year of MD Gastroenterology programme</p> <ul style="list-style-type: none"> • Written: Paper I: MCQs Paper II: SEQs
Part-II	<p>Fundamental Concepts in Internal Medicine :</p> <p>Training in clinical techniques of Internal Medicine with compulsory rotations for two years starting from the first day of enrollment</p>	<p>Part-II examination at the end of 2nd year of MD Gastroenterology programme.</p> <ul style="list-style-type: none"> • Written: Papers 1 & 2: Problem-based questions in Internal Medicine • Oral & Practical/ Clinical Examination <ul style="list-style-type: none"> • OSCE • Clinical Examination (Long case, Short cases) • Log Book
Part-III	<p><u>Clinical component of Part III</u></p> <ul style="list-style-type: none"> • Professional Education in Gastroenterology Training in Gastroenterology during 3rd, 4th and 5th years of MD programme <p>Three years of training with compulsory/ optional rotations in related fields (up to 6 months)</p> <p><u>Research component of Part III</u></p> <ul style="list-style-type: none"> • Research and Thesis Writing: Research work/Thesis writing project must be completed and thesis be submitted before the end of training. 	<p>Part-III examination in specialized components of Gastroenterology at the end of 5th year of MD programme</p> <ul style="list-style-type: none"> • Written: Paper 1 & 2: Problem-based questions in the subject • Oral & Practical / Clinical Examination <ul style="list-style-type: none"> • OSCE • Clinical Examination (Long case, Short cases) • Log Book <p>Part-III thesis examination with defence at the end of fifth (5th) year of MD Gastroenterology programme.</p>

2. Examinations

Part-I Examination

1. All candidates admitted in MD Gastroenterology courses shall appear in Part-I examination at the end of 1st 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 Gastroenterology (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 Gastroenterology course shall appear in Part-II examination at the end of 2nd calendar year, and having passed 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:
Paper 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 Gastroenterology 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 Gastroenterology 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 3rd 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 5th 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 Gastroenterology Degree

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

CONTENT OUTLINE

Part I MD Gastroenterology

Basic Sciences:

Student is expected to acquire comprehensive knowledge of Anatomy, Physiology, Pathology (Microbiology), Biochemistry, Pharmacology relevant to the clinical practice appropriate for Gastroenterology

1. Anatomy

General Organization of the Body

- Anatomical nomenclature
- Terms of position
- 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
- 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.

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 abdomen and pelvis. Common developmental anomalies associated with this.

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.

Organ of Taste

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

Gastrointestinal System

- Development of the gastrointestinal 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.

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.

Body Cavities:

- Abdominal, thoracic, 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.

Gross and Surface Anatomy

- Organs of the alimentary canal
- Layers of gastrointestinal tract
 - Mucosa
 - Submucosa
 - Muscularis
 - Serosa

Structure and functional anatomy of:

- *Oral cavity*
 - Teeth
 - Tongue
 - Taste buds
 - Pharynx
- Buccal glands
- Parotid glands
- Submandibular glands
- Sublingual glands

Esophagus

- Sphincters
- Musculature
- Circulation and innervation

Stomach

- Sphincters
 - Cardiac
 - Pyloric
- Secretions
- Mucus
- Enzymes
- Circulation and innervation

Small intestine

- Divisions
 - Duodenum
 - Jejunum
 - Ileum

- Mesentery
- Structural modifications
 - Plica circularis
 - Villi
 - Microvilli
- Innervation

Large intestine

- Divisions
 - Cecum
 - Colon
 - Rectum
 - Anal canal
- Muscularis
- Mucosa
- Glands
- Circulation

Liver and gall bladder

- Location and lobes of liver
- Ductular system of gall bladder
- Portal and hepatic venous system.

Pancreas

- Head, body and tail of pancreas
- Ductal system and secretions

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 the 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.

Gastrointestinal function:

- General functions of the gastrointestinal system
 - Motor functions

- Reservoir function
- Digestion and absorption
- Emptying function
- Regulation of gastrointestinal function
- Motility: mastication, swallowing, gastric motility, intestinal motility and gall bladder motility.
- Secretory activity: formation, composition, function and control of saliva, gastric, pancreatic, bile and intestinal secretions.
- Control of secretions
 - Cephalic phase
 - Gastric phase
 - Intestinal phase
 - Interdigestive phase
- GIT hormones controlling activities: Functions of the stomach, pancreas, gall bladder, liver and large intestine.
- Formation and composition of faeces, haustral churning, slow peristalsis, mass peristalsis, mechanism of defecation.
- Circulation of bile. Principles and assessment of liver function tests. Interpretation of data, diagnostic tests.
- Hyperbilirubinaemia and congenital hyperbilirubinaemias.
- Hunger and thirst centers of the brain
- Control of hunger, appetite and its disorders.

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

- 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
 - Absorption
 - Distribution
 - Metabolism
 - Desired Plasma Concentration
 - Volume of Distribution
 - Elimination
 - Elimination rate constant and half life
 - Creatinine Clearance
- Drug Effect
 - Beneficial Responses
 - Harmful Responses
 - Allergic Responses
 - Drug Dependence, Addiction, Abuse and Tolerance
 - Drug Interactions
- Drug use in pregnancy and in children
- Autonomic Pharmacology
- Basic concepts of pharmacokinetics and dynamics of:
- Pharmacology of drugs used in GI disorders e.g. antacids, motility drugs, anti H. pylori therapy, drugs controlling other GI secretions, Ulcerative colitis and immunosuppressive drugs.
- Immunopharmacology
- Chemotherapy
- Antibacterial, antimycobacterial, antiviral, antifungal and antiparasitic
- Vitamins and Antioxidants

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
- 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.
- Describe the compensatory mechanisms involved in shock
- Describe the pathogenesis and possible consequences of thrombosis
- Describe the 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 microbiology laboratory
- Protective immunity to microbial diseases
- Tumour immunology
- Immunological tolerance, autoimmunity and autoimmune diseases.
- Transplantation immunology
- Hypersensitivity
- Immunodeficiency disorders
- Immunoprophylaxis & Immunotherapy

Haematopathology

- Normal blood picture & variation in disease

Microbiology

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

Bacterial Growth and Death

- Names, habitat, modes of transmission/infection, pathogenic mechanism and pathological changes produced by bacteria, commonly causing human diseases in Pakistan
- Names of bacteria and diseases produced by bacteria not commonly found in Pakistan.
- Morphology: Identification of various shapes of bacteria and viruses under the microscope.

- Distribution, size, motility, reproduction and functions of bacteria and viruses.
- 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 diseases produced by fungi commonly found in Pakistan, including dermatophytes, maduromycosis and opportunistic infections.

Important Parasites;

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

6. Biostatistics & Research Methodology

1. Introduction to Bio-Statistics
2. Introduction to Bio- Medical Research
3. Why research is important?
4. What research to do?
 - Selecting a Field for Research
 - Drivers for Health Research
 - Participation in National and International Research
 - Participation in Pharmaceutical Company Research
 - Where do research ideas come from
 - Criteria for a good research topic
5. Ethics in Health Research
6. Writing a Scientific Paper
7. Making a Scientific Presentation
8. Searching the Literature

7. Behavioural Sciences

1. Bio-Psycho-Social (BPS) Model of Health Care
2. Use of Non-medicinal Interventions in Clinical Practice
 - Communication Skills
 - Counselling
 - Informational Skills
3. Crisis Intervention/Disaster Management
4. Conflict Resolution
5. Breaking Bad News

6. Medical Ethics, Professionalism and Doctor-Patient Relationship

- Hippocratic Oath
- Four Pillars of Medical Ethics (Autonomy, Beneficence, Non-maleficence and Justice)
- Informed Consent and Confidentiality
- Ethical Dilemmas in a Doctor's Life

7. Delivery of Culturally Relevant Care and Cultural Sensitivity

8. Psychological Aspects of Health and Disease

- Psychological Aspect of Health
- Psychological Aspect of Disease
- Stress and its Management
- Psychological Aspect of Pain
- Psychological Aspect of Aging

Part II MD Gastroenterology

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 Gastroenterological 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. Dermatology;

Common and / or Important Problems:

- Cellulitis
- Cutaneous drug reactions
- Psoriasis and eczema
- Skin failure: eg erythryoderma, toxic epidermal necrolysis
- Urticaria and angio-oedema
- Cutaneous vasculitis
- Herpes zoster and Herpes Simplex infections

- Skin tumours
- Skin infestations
- Dermatomyositis
- Scleroderma
- Lymphoedema

Clinical Science:

- Pharmacology of major drug classes: topical steroids, immunosuppressants

3. 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

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
- Thrombocytopenia
- 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, disulpharam, acamprosate, methadone)

14. Cancer and Palliative Care

Common or Important Gastroenterology 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 chemotherapeutic and palliative 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

Investigation Competencies

Outline the Indications for, and Interpret the Following Investigations:

- Basic blood biochemistry: urea and electrolytes, liver function tests, bone biochemistry, glucose, magnesium
- 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 / Stool / urine culture
- Fluid analysis: peritoneal, ascitic
- Abdominal and pelvic radiograph

More Advanced Competencies;

- Viral hepatitis serology
- HIV testing
- Ultrasound
- Detailed imaging: Barium studies, CT, CT Gastroenterological angiography, high resolution CT, MRI
- Ambulatory blood pressure monitoring

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
- Ascitic tap and aspiration
- Abdominal paracentesis

- Central venous cannulation
- Initial airway protection: chin lift, Guedel airway, nasal airway, laryngeal mask
- Basic and, subsequently, advanced cardiorespiratory resuscitation
- Cytology: ascitic fluid, saliva
- Nasogastric tube placement and checking
- Enteroscope insertion and monitoring
- Urethral catheterization

Part-III - Specialty training in Gastroenterology

Specific Program Content

1. Specialized training in Gastroenterology
2. Compulsory rotations
3. Research & thesis writing
4. Maintaining of Log-book

UPPER GASTROINTESTINAL DISORDERS

Esophageal Disorders

- Motility of the esophagus and motor disorders
- Mechanism of deglutition and dysphagia
- Achalasia, diffuse esophageal spasm and other spastic disorders,
- Non-cardiac chest pain
- Approach to a patient with dysphagia
- Gastro-esophageal reflux disease
- Tumors of the esophagus
- Esophageal webs, membranes and diverticulum
- Management of benign and malignant esophageal strictures
- Dysplasia and endoscopic management
- Rumination syndrome, belching, aerophagia, Hiccups, evaluation
- Esophagus and systemic diseases
- Infectious diseases of the esophagus
- Foreign bodies in the esophagus and stomach
- Esophageal perforation
- Drug induced esophagitis

Gastric Disorders

- Physiology of acid and bicarbonate secretion in health and diseases
- Defence mechanisms against acid and pepsin
- Gastroduodenal motor function in health and diseases.
- Gastritis (nonspecific and specific)
- Helicobacter pylori infection
- Peptic ulcer
- Dyspepsia
- Stress and stomach
- Gastric hypersecretory states including Zollinger Ellison syndrome
- Ulcer complications and their management
- Surgery for peptic ulcer
- Post gastrectomy complication
- Bezoars
- Tumors of the stomach including gastric polyps and gastric carcinoids
- Diverticuli and hernia of the stomach

LOWER GASTROINTESTINAL DISORDERS**Small Intestinal Disorders**

- Motility of the small intestine
- Congenital anomalies
- Normal absorption of the nutrients
- Intestinal electrolyte absorption and secretion
- Malabsorption syndromes
- Pathophysiology, manifestations and approach
 - Celiac sprue
 - Infection related diseases
 - Intestinal microflora in health and diseases
 - Tropical sprue
 - Whipple's disease
 - Infectious diarrhoea and food poisoning
 - Parasitic diseases
- Small intestinal ulcers
- Short bowel syndrome and intestinal transplantation.
- Eosinophilic gastroenteritis
- Food allergies
- Intestinal obstruction
- Intestinal pseudo-obstruction and scleroderma
- Irritable bowel syndrome and functional GI disorders
- Disorders of nutrient assimilation/malnutrition
- Acute appendicitis
- Malrotation of the gut
- Bezoars
- Management of diarrhoea
- GI lymphomas
- Small intestinal tumors

Colonic Disorders

- Motility of the colon and disorders of motility
- Congenital anomalies
- Megacolon
- Constipation
- Colonic pseudo-obstruction
- Fecal incontinence
- Antibiotic associated diarrhoea
- Inflammatory bowel disease
 - Ulcerative colitis
 - Crohn's disease
 - Indeterminate colitis
- Ileostomies and its management
- Diverticular disease and complications/diverticulitis
- Radiation entero-colitis
- Colonic polyps and polyposis syndromes
- Malignant diseases of the colon
- Colon cancer and screening
- Polyp surveillance, malignant polyps/serrated adenomas

- Constipation, pelvic floor dysfunction, evaluation and management
- Endoscopic resection of colorectal polyps, guidelines and management
- Familial colorectal cancer
- Evidence based guidelines for post-colon cancer management and guidelines

Other small bowel and colonic diseases

- Constipation and pelvic floor dysfunction
- Small bowel bacterial overgrowth syndrome
- Collagenous and microscopic colitis
- Non specific ulcerations of the colon
- Malakoplakia
- Pneumatosis cystoides intestinalis
- Microscopic colitis
- Radiation colitis and enteritis
- Solitary rectal ulcer syndrome
- Diversion colitis
- Graft vs host disease
- Diseases of the anorectum
- Hemorrhoids and anal fissure
- Anal canal benign and malignant diseases
- Fecal incontinence and evaluation, fecal impaction

Gastrointestinal immune disorders and infections

- Retroviral, mycotic, and parasitic diseases
- C-difficile infection and management of recurrent disease
- Celiac sprue
- Eosinophilic GI disorder/allergic GI disorder
- GI involvement in autoimmune disorders

Vascular Diseases of the GI Tract

- Mesenteric ischemia
- Acute ischemic colitis/chronic mesenteric ischemia
- Portal venous thrombosis

Pediatric Gastroenterology

- IBD issues in pediatric population
- Neonatal jaundice, and cholestasis
- Common pediatric gastrointestinal problems:
 - Abdominal pain, constipation, diarrhea, cystic fibrosis necrotizing enterocolitis, Meckel's diverticulum, intestinal intussusception, and mid-gut volvulus
- GI complications of malignancy and treatment
- Rickets and other systemic disorders in GI and liver diseases

Geriatric Gastroenterology

- Endoscopic gastrostomy tube risks and complications
- Evaluation and risks of endoscopic procedures among elderly

- Effect of aging on gastrointestinal tract and common GI illness among elderly population

Parenteral and Enteral Nutrition

- General indications and contraindications for parenteral and enteral nutrition.
- Utility of central and peripheral parenteral nutrition including advantages and disadvantages.
- IV access utilized in parenteral nutrition.
- Major components of nutritional assessments and demonstrate the calculations for the usual requirements of fluids, carbohydrates, protein, fat and calories.
- Parenteral nutrition formula for a given patient.
- Advantages and disadvantages of total nutrient admixture system.
- Application of transitional therapy as it applies to parenteral nutrition.
- Rationale and benefit of early enteral feeding.
- Differences in macronutrients available in enteral formulas.
- Benefits that enteral products with fiber provide.
- Advantages/disadvantages of polymeric, partially hydrolyzed and disease specific formulas.
- Formula osmolarity and its effect on enteral feeding tolerance.
- Indications and advantages and disadvantages of the following access routes: nasogastric, gastrostomy and jejunostomy.
- Difference between continuous and intermittent feedings, including advantages, disadvantages and general administration protocols.
- Complications of parenteral and enteral nutrition including mechanical, gastrointestinal, infectious and metabolic.
- Monitoring guidelines for parenteral and enteral nutrition.

Gastrointestinal Oncology

Esophageal cancer

- Risk factors
- Indications for endoscopy in diagnosis and staging
- Indications for nutritional support
- Importance of combined modality therapy
- Role of palliative chemotherapy and other supportive measures

Gastric cancer

- Risk factors
- Major surgical approaches to the disease and potentially curative role of combined modality therapy
- Role of palliative chemotherapy and other supportive measure

Colon cancer

- Risk factors and rationale for screening of colorectal cancer, as well as its chemoprevention
- Role of genetic testing in colorectal cancer
- Surgical staging
- Indications for adjuvant therapies in colon and rectal cancers and role of chemotherapy in advanced metastatic disease

- Heritable types of colon cancer and differences in their pattern of spread and management
- GI stromal tumors
- HIV related malignancy

Anal cancer

- Association of human papilloma virus and anal cancer
- Role of combined modality therapy in organ preservation

Hepatobiliary cancers

- Epidemiology and risk factors
- Role of alpha-fetoprotein in diagnosis, response assessment and screening of hepatobiliary cancers
- Indications for curative role of surgery in localized disease
- Role of systemic and intra-arterial chemotherapy

Pancreatic cancer

- Risk factors
- Genetic aspects of pancreatic cancer
- Role of endoscopy
- Role of molecular diagnosis
- Curative role of surgery in rare patients and palliation in others
- Palliative role of chemotherapy in advanced disease

Techniques used in the investigation of gastrointestinal cancers

- Flow cytometry
- Polymerase chain reaction assays
- Mutation analysis
- Methylation assays
- DNA sequencing and linkage analysis

Clinical Pharmacology of Gastrointestinal Disorders:

- Structure/activity relationships and physiochemical properties relating to agents used in the treatment of following common GI disorders:
- Dosage schedules used in the treatment and maintenance of peptic ulcer disease and NSAID-induced ulcers.
- Anti-secretory effects of H₂-receptor antagonists, proton pump inhibitors, anticholinergics, and prostaglandins, antacids and antibacterials in the treatment and management of peptic ulcer disease and NSAID-induced ulcers.
- Significance of side effects/adverse reactions and drug interactions of anti-ulcer medications.
- Rational pharmacologic treatment plan for preventing the complications of stress related mucosal damage
- Monitoring plan, including efficacy and toxicity profile for the prophylactic regimen chosen.
- Mechanism of action, doses, adverse drug reactions, drug interactions, clinical efficacy for the available drug therapy for GERD.
- Classifications and histological abnormalities of drug induced liver disease
- Treatment modalities for hepatic diseases and complications.
- Prophylaxis including doses for acute viral hepatitis.
- Drugs causing acute pancreatitis.

- Role of non-pharmacologic and pharmacologic treatment modalities in the management of acute and chronic pancreatitis.
- Appropriate pharmacologic treatments for the management of fluid depletion, electrolyte derangements, pain, chronic nutritional deficiencies and malabsorption experienced by patients with acute and chronic pancreatitis.
- Structure/activity relationships and physiochemical properties relating to agents used in the treatment of pancreatitis
- Role of corticosteroids and sulfasalazine in managing IBD with indications for this agent in IBD, proposed mechanism(s) of action, recommend dosages at various stages of the disease and untoward effects associated with their use.
- Immunosuppressives (i.e. azathioprine, cyclosporine), infliximab, immune adjuvants (i.e. levamisole), mast cell stabilizers (i.e., cromolyn sodium) in the treatment of IBD.
- Metronidazole and antidiarrheal agents such as anticholinergics, antispasmodics and bile salt binding resins in IBD.
- Proposed mechanism of action, site of action, efficacy and side effects of the following antiemetic drugs:
 - Phenothiazines
 - Benzodiazepines
 - Antihistamines
 - Anticholinergics
 - Ondansetron
 - Cannabinoids
 - Metoclopramide
 - Corticosteroids
- Potential benefits of combining two or more antiemetic agents and give examples
- Drugs that are known to cause constipation and diarrhea.
- Non-pharmacologic management of complications or causes of diarrhea and constipation.
- Mechanisms of action, doses, adverse effects, and drug interactions of medications used in the management of diarrhea and constipation.
- Appropriate questions to ask a patient being assessed for diarrhea or constipation.

GI Radiology

- Reading and interpreting the common x-ray films including X-ray films of the abdomen
- Barium studies, ultrasound examination
- CT scans, MR scans and angiography and ERCP films
- CT Colonography
- CT enterography
- PET Scan

Endoscopic Training

- Endoscopes and accessories
- Sterilization of endoscopes and accessories

- Other electrosurgical instrument
- Consent and pre-procedure patient evaluation
- Sedation and monitoring
- Advance endoscopic technique
- Capsule endoscopy
- Double balloon enteroscopy, single fiber endoscopy, narrow band imaging and confocal (high magnification endoscopy)
- Anticoagulants and antiplatelet agents and GI endoscopy
- Complications of endoscopic procedures

Clinical/Laboratory Tests for GI Structure and Function

- Oesophageal, gastric and ano-rectal function tests ; oesophageal pH monitoring, oesophageal and ano- rectal motility/manometry, gastric emptying studies
- Gastric secretion tests ; relevance of 24h intragastric H⁺ concentration, maximal acid output, effect of pentagastrin and gastrin releasing peptide
- Tests for malabsorption ; SeHCAT, PABA, lactose breath H₂, lactulose breath H₂, faecal elastase
- Tests for inflammation ; serological and nuclear medicine testing including Tc WBC scans
- Radiological evaluation ; Plain x-rays of abdomen, barium studies of GI tract CT, MRI and ultrasound
- Histopathology evaluation ; Histological features of common gastrointestinal and liver disease with appreciation of the histological findings in discussion with histopathologists

Common gastrointestinal manifestations:

- Anorexia and weight loss
- Nausea and Vomiting
- Cyclical vomiting in adults and idiopathic nausea
- Dysphagia and non cardiac chest pain
- Upper abdominal pain/dyspepsia
- Peptic ulcer type dyspepsia
- Gall bladder type dyspepsia
- Non ulcer dyspepsia
- Steatorrhoea Malabsorption
- Gastrointestinal Bleeding
- Evaluation of anaemia
 - Iron deficiency anaemia
 - Macrocytic anaemia
- Short bowel syndrome/ ileostomy diarrhea
- Acute abdominal pain
- Chronic abdominal pain
- The spectrum of functional bowel disorders including burden of disease, sub types and etiological factors.
 - Oesophageal Dysmotility
 - Functional dyspepsia -
 - Epigastric pain syndrome
 - Postprandial distress syndrome
 - Irritable bowel syndrome and its subtypes

- Diarrhea/Constipation
- Obstructive defecation, proctalgia fugax
- Change in bowel habit
- Rectal bleeding and perianal fistulae
- Jaundice
- Hepatosplenomegaly and abdominal swelling
- Abdominal masses including cysts
- Confusion progressing to liver failure

Miscellaneous

- Gastrointestinal tuberculosis
- HIV and the GIT, hepatobiliary and pancreatic systems
- GIT and liver in systemic diseases
- Cutaneous manifestations of GI diseases
- Gastrointestinal side effects of drugs especially NSAIDs
- Management of GI emergencies in the acutely ill patient including ileus
- Foreign body management

HEPATOLOGY

Hepatic Disorders

- Functions of the liver
- Microcirculation of liver
- Liver function tests
- Acute viral hepatitis
- Chronic hepatitis
- HBV resistance
- Treatment of viral hepatitis (B and C)
- Fulminant hepatic failure
- Subacute hepatic failure
- Alcoholic liver disease
- Non-alcoholic fatty liver disease
- Spontaneous bacterial peritonitis and hepatorenal syndrome in liver failure
- Tips in the management of complications of liver disease
- Cirrhosis of liver
- Portal hypertension
- Extrahepatic portosplenic vein obstruction
- Hepatic venous outflow tract obstruction
- Fibrocystic diseases of the liver
- Ascites
- Non cirrhotic portal fibrosis
- Drug and toxin induced liver disease
- Pregnancy related hepatobiliary disease
- Cholestatic syndromes (Primary and secondary sclerosing cholangitis/primary biliary cirrhosis etc)
- Genetic liver diseases (hemochromatosis, alpha-1 antitrypsin deficiency, Wilson's disease)
- Metabolic liver disease
- Liver in porphyria

- Infections of the liver
- Liver in congestive heart failure
- Complication of chronic liver disease
- Autoimmune liver diseases
- Vascular disorders of liver (Budd-Chiari and ischemic/hypoxic hepatitis)
- Perioperative evaluation and management of liver disease patient
- Liver transplantation and artificial liver support
- Pre-transplant evaluation
- Management and evaluation of post-transplant patients
- Hepatocellular carcinoma/other hepatic malignancy
- Liver imaging modalities
- Liver biopsy

Biliary Tract Disorders

- Physiology of bile formation and excretion
- Enterohepatic circulation
- Bilirubin metabolism.
- Approach to a patients with jaundice
- Gallstones, its complications, and management
- Acute acalculous cholecystitis
- Miscellaneous disorders of the gallbladder
- Acute cholangitis
- Benign biliary stasis
- Benign and malignant neoplasms of the biliary system.
- Endoscopic management of biliary obstruction.
- Motility and dysmotility of the biliary system and sphincter of Oddi dysfunction
- Congenital diseases of the biliary systems

Pancreatic Disorders

- Pancreatic function tests
- Acute pancreatitis
- Recurrent acute pancreatitis
- Chronic pancreatitis
- Idiopathic pancreatitis
- Nutritional support in acute and chronic pancreatitis
- Radiologic evaluation of pancreas and biliary tract
- Biliary dyskinesia/sphincter of Oddi dysfunction
- Pancreatic divisum
- Molecular genetic of hereditary pancreatic disorders
- Malignancies of the pancreas(Exocrine and endocrine)
- Cystic fibrosis and other childhood disorders of the pancreas
- Hereditary pancreatitis
- Pancreatic transplantation

2. Compulsory rotations in the relevant fields for 3-6 months

Clinical training experiences are described below:

1. Intensive Care Units

On this 3 months rotation, the resident shall develop competence in the differential diagnosis and management of the critically ill, and learn to integrate these clinical skills with the biomedical instrumentation of bedside hemodynamic measurements, right heart catheterization, measurement and computation of gas exchange variables, cardiac output determination, and all aspects of mechanical ventilation and airway care. These principles, and those governing fluid therapy, nutritional support, and antimicrobial therapy in severely ill patients, shall be reviewed extensively.

2. Outpatient Services

Gastroenterological outpatient training shall be provided during the entire residency in a continuity to review findings and to discuss patient care issues. Residents shall assume primary responsibility for managing their patients

3. Radiation Gastroenterology

The resident shall learn to prescribe and monitor the different doses and methods of radiation therapy in management of different types of malignancies.

4. Organ Transplantation

This popular rotation shall provide residents with an intense introduction to the selection of transplant candidates and the management of these patients after transplantation. Residents shall work with a dedicated group of organ transplant physicians and learn the indications, contraindications and the relative protocols and precautions required for these transplantations.

5. Gastroenterological Rehabilitation Rotation

This rotation shall expose residents to issues in rehabilitation of patients with chronic gastroenteric diseases

6. Elective experiences in Pathology and Laboratory Medicine as well as **Radiology** and **Infectious diseases centre** for 1 month each in the relevant departments

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 5th 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 Gastroenterology 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 Gastroenterology 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 procedures (pg.12,13,46,47) , preferably done on patients firstly under supervision and then independently.

3. Annual Grand Meeting

Once a year all residents enrolled for MD Gastroenterology 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 Gastroenterology
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					

Gastroenterological 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 GASTROENTEROLOGY EXAMINATIONS

Part I MD Gastroenterology

Total Marks: 200

All candidates admitted in MD Gastroenterology 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:

	Paper-I	Paper-II
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 Gastroenterology

Total Marks: 430

All candidates admitted in MD Gastroenterology course shall appear in Part II examination at the end of 2nd 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:

Paper 1:	<u>100 Marks</u>	3 Hours
10 SEQs (No Choice; 05 marks each)	50 Marks	
50 MCQs	50 Marks	
Paper 2:	<u>100 Marks</u>	3 Hours
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 Gastroenterology**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. Upper GI Disorders | (25 MCQs) |
| 2. Lower GI Disorders | (25 MCQs) |
| 3. Pediatric and Geriatric Gastroenterology | (25 MCQs) |

Topics included in paper 2

- | | |
|--|-----------|
| 1. Hepatology | (20 MCQs) |
| 2. GI Radiology and Other Diagnostic tests | (15 MCQs) |
| 3. Gastrointestinal Oncology | (15 MCQs) |
| 4. Parenteral and Enteral Nutrition | (15 MCQs) |
| 5. Vascular, Infectious & Immune Disorders | (10 MCQs) |

Components of Part III Examination**Theory**

Paper I	<u>150 Marks</u>	3 Hours
15 SEQs (No Choice)	75 Marks	
75 MCQs	75 Marks	
Paper II	<u>150 Marks</u>	3 Hours
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 5th calendar year of the MD programme and not later than 8th calendar year of enrolment. The examination shall include thesis evaluation with defense.