

Study Guide

2nd Year MBBS

GIT & NUTRITION-1

Block 4



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Vision & Mission

Vision & Mission of UHS

Vision statement

UHS is a leading university aiming to keep its graduates apt with the ever-emerging global health challenges evolving educational methodologies and emerging technological advancements to maintain its distinguishable positions as a Medical University.

Mission statement

UHS shall continue to strive for producing a human resource par and excellence to cater for the health needs of the people of Punjab and Pakistan.

Vision & Mission of SMDC

To be recognized for the provision of a safe and functional environment conducive to collaborative teaching & learning, comfortable working atmosphere and conducting world class research through professionalism and excellence.

'Veritas et Devotio'

Mission

Sharif Medical & Dental College is dedicated to best serving the nation through preservation and dissemination of advanced knowledge and educating the students by latest trends in learning and research reaching levels pars excellence.

The Institution is committed to provide standardized quality medical education to its students by inculcating professional knowledge, skills, and responsibilities in them with the aim of:

- Preparing them as modern physicians having initiative to act as future leaders in their respective fields and becoming lifelong learners.
- Encouraging the spirit of critical thinking through research and publication.
- Building up an understanding of the ethical values compatible with our religion, culture, and social norms.
- Developing a sense of being responsible citizens of society possessing professional competence and instilling in them the values of hard work and dedication thus preparing them to be accountable to the stakeholders and the state.

The Institution is devoted to keep abreast its faculty with the latest trends in Medical Education encompassing teaching/learning methodologies, assessment tools, research opportunities and professionalism to facilitate their professional development, competencies, and commitment towards continues learning.

Our patient-centered mission is achieved by outstanding medical care & services in professional practice with due emphasis and focus on our local health needs.

Our mission further elaborates upon establishing academic and research facilities in areas of local demand under global gold standards and leading advancement in research, education & patient care.

List of Abbreviations

Abbreviations	Subjects
A	Anatomy
ABG	arterial blood gas
Ag	Aging
AKI	acute kidney injury
ALT	alanine transaminase
AMP	Adenosine monophosphate
ANS	Autonomic Nervous System
AST	aspartate aminotransferase
AV	Atrioventricular
B	Biochemistry
BhS	Behavioral Sciences
C	Civics
CBC	Complete Blood Count
C-FRC	Clinical-Foundation Rotation Clerkship
CK	Creatine kinase
CM	Community Medicine
CNS	Central Nervous System
CO	Carbon monoxide
CO ₂	Carbon dioxide
COPD	Chronic obstructive pulmonary disease
COX	cyclooxygenase
CPR	Cardio pulmonary Resuscitation
CT	Computed tomography
CV	Cardiovascular
CVA	cerebral vascular accident
DALY	Disability-Adjusted Life Year
DCMLS	Dorsal column medial lemniscus system
DLC	differential Leukocyte Count
DNA	Deoxy Ribonucleic Acid
ECF	Extra Cellular Fluid
ECG	Electrocardiography
ECP	Emergency contraceptive pills
EEG	Electroencephalogram
EnR	Endocrinology & Reproduction
ENT	Ear Nose Throat

ER	Emergency Room
F	Foundation
FEV1	Forced Expiratory Volume 1
FM	Forensic Medicine
FVC	Forced Vital Capacity
GFR	Glomerular Filtration Rate
GIT	Gastrointestinal tract
GMP	guanosine monophosphate
GO	Gynecology and Obstetrics
GTO	Golgi Tendon Organ
HCL	Hydrochloric acid
H & E	Hematoxylin and eosin
HL	Hematopoietic & Lymphatic
HMP	Hexose Monophosphate
HNSS	Head & Neck and Special Senses
ICF	Intra Cellular Fluid
IL	Interleukin
IN	Inflammation
INR	International Normalized Ratio
IUD	Intrauterine device
IUGR	Intra Uterine Growth Restriction
JVP	Jugular Venous Pulse
LDH	Lactate Dehydrogenase
M	Medicine
MALT	Mucosa Associated Lymphoid Tissue
MCH	Mean Corpuscular Volume
MCV	Mean Corpuscular Volume
MRI	Magnetic resonance imaging
MS	Musculoskeletal
MSD	Musculoskeletal disorders

NEAA	non-essential amino acids
NMJ	Neuro Muscular Junction
NS	Neurosciences
O	Ophthalmology
Or	Orientation
P	Physiology
Pa	Pathology
PAF	Platelet activating factor
PBL	Problem Based Learning
PCR	Polymerase Chain Reaction
PDGF	Platelet derived growth factor
Pe	Pediatrics
PEM	Protein Energy Malnutrition
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology
PNS	Peripheral Nervous System
Psy	Psychiatry
PVC	Premature Ventricular Contraction
QALY	Quality-Adjusted Life Year
QI	Quran and Islamiyat
R	Renal
Ra	Radiology
RBCs	Red Blood cells
RDA	Recommended Dietary Allowance
Re	Respiratory
RFLP	Restriction Fragment Length Polymorphism
RMP	Resting Membrane Potential
RNA	Ribonucleic Acid
S	Surgery
SA	Sinoatrial
TCA	Tricarboxylic acid cycle

TNF	Tumor Necrotic Factor
USG	Ultrasonography
UTI	Urinary Tract Infections
WBCs	White Blood Cells

Introduction to study guide

Welcome to the second year of medical school! This phase of your medical education typically marks a significant transition from the foundational knowledge gained in your first year to more clinical applications and deeper understanding of medical concepts. This study guide will help you to know about the syllabus of the first block of second year is BLOCK 4. Here's an introduction to what you can expect in your second year:

Clinical Clerkships: Second year often involves starting clinical clerkships, where you'll rotate through various specialties. These clerkships provide hands-on experience in different medical settings and specialties, allowing you to apply your knowledge in real-life scenarios and interact with patients under supervision.

Continued Basic Sciences: While the emphasis shifts towards clinical experiences, you'll still engage with basic science courses, albeit at a little more advanced level. These courses may include topics like pharmacology, pathology, microbiology, and physiology, which provide the foundation for more understanding of diseases and their treatment.

Integration of Clinical Skills: You will continue to develop clinical skills such as history-taking, physical examination, communication with patients, and medical decision-making. These skills are essential for becoming a competent physician and will be honed through practice, feedback, and guidance from clinical instructors.

Research and Extracurricular Activities: Dear students conducting research, volunteering, or joining student activities, can enhance your medical college experience and help you grow as a future physician.

Maintaining Balance: Balancing the demands of coursework, clinical skills learning, exam preparation, and personal life can be challenging during your second year.

Overall, the second year of medical school is an exciting and challenging time as you continue to build upon your foundation of medical knowledge, gain clinical experience, and prepare for the next stages of your medical career. Embrace the opportunities for growth, stay focused on your goals, and remember to enjoy the journey.

Block 4

It consists of two modules

- GIT & Nutrition-1
- Renal -1

We will study in detail the different parts of gastrointestinal system and Renal-1, their functional, embryological and histological anatomy, physiological and biochemical aspects of its functioning. Students will also be introduced to clinical and pathological aspects, pharmacological interventions and preventive measures for common diseases related to the system.

Key Areas of Focus

Anatomy: Understanding the structure of the human body is essential for any aspiring physician. Spend ample time in the cadaver lab and utilize anatomical atlases to reinforce your learning.

Physiology: Gain a deep understanding of how the body's systems function in health and disease. Focus on concepts such as homeostasis, cellular physiology, and organ systems.

Biochemistry: Explore the molecular mechanisms underlying physiological processes. Pay particular attention to biochemical pathways, enzyme kinetics, and metabolic regulation.

Histology: Study the microscopic structure of tissues and organs to comprehend their functions and pathology. Use microscopy slides and digital resources to aid in your understanding.

PERLs: Affective training has been formally inculcated in the curricular framework. The model of PERLs has been introduced so that the yield of doctors has a strong, resilient, ethically driven character. PERLs stand for Professionalism, Ethics, Research and Leadership skills. PERLs rounds up professional development for the effective application of the knowledge and skills base achieved.

C-FRC-1: In your second year of Clinical Skills- in this block which will represent clinical orientation. The clinical orientation will be conducted in wards, skills lab and simulation centers (depending on the available resources). The clinical orientation along with the applied/clinical component of the knowledge base will channelize the learner for the practical and professional aspect of learning.

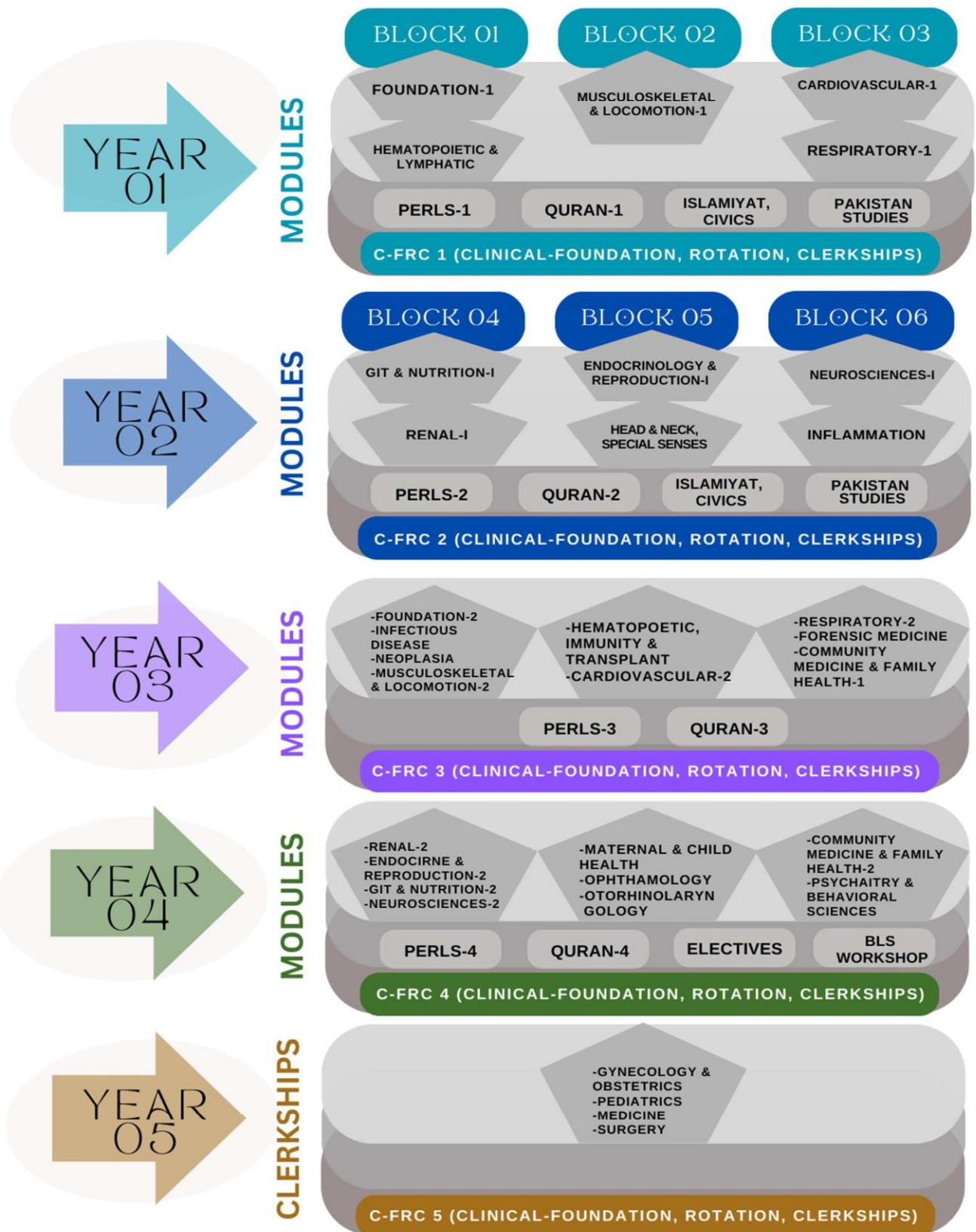
Islamiyat and Pak studies

Both subjects are important in the curriculum as they help students understand their religious and national identity, as well as the values and principles upon which the nation was founded. They provide a foundation for students to develop a sense of citizenship, cultural awareness, and a deeper understanding of their heritage.

Curriculum framework

Curriculum 2K23 version 2.0

CURRICULUM FRAMEWORK



Modular Committee

Sr No.	Foundation Module Calendar	Faculty Members
1.	GIT & NUTRITION-1	• Prof. Uzma Ahsan, Head Dept of Dermatology • Prof. Maria Aslam, Head Dept of Pathology • Prof. Taj Jamshaid, Dept of Medicine • Prof. Samra Hafeez, Prof Dept of Biochemistry • Dr. Uzma Shahid, Head Dept of Medical Education • Dr. Qurat tul Ain, Associate Professor Dept of Physiology • Dr. Nadia, Associate Professor Dept of Anatomy • Dr. Amna Iqbal, Associate Professor Dept of Community Medicine • Dr. Sabeen Arjumand, Associate Professor Dept of Pharmacology • Dr. Shahid Senior Registrar, Dept of Peadritics
2.	Renal -1	• Prof. Uzma Ahsan, Head Dept of Dermatology • Prof. Maria Aslam, Head Dept of Pathology • Dr. Nadia Ahmad, Associate Professor Dept of Anatomy • Dr. Qurat tul Ain, Associate Professor Dept of Physiology • Prof Samra Hafeez, Professor Dept of Biochemistry • Dr. Uzma Shahid, Head Dept of Medical Education • Dr. Sabeen Arjumand, Associate Professor Dept of Pharmacology • Dr. Amna Iqbal, Associate Professor Dept of Community Medicine • Dr. Komal, Registrar, Dept of Medicine • Dr. Shahid, Senior Registrar, Dept of Peadritics • Dr. Ahmad Bashir, Registrar, Dept of Urology

FACULTY

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MODULE 06

GIT & NUTRITION-I

Module rationale

Gastrointestinal system is an integral part of human body which is primarily related to consumption, digestion and assimilation of food to provide nutrition and calories on regular basis to human body which are essential for basic functioning of each organ of human beings.

We will study in detail regarding different parts of gastrointestinal system, their functional, embryological and histological anatomy, physiological and biochemical aspects of its functioning. Students will also be briefly introduced to clinical and pathological aspects, pharmacological interventions and preventive measures of common diseases related to the system.

We have assigned six (6) weeks in academic calendar of 2nd year curriculum of MBBS to Gastrointestinal Module. We have divided our module into eight (8) themes. For every theme, anatomy, physiology, biochemistry, pathology, pharmacology, community medicine, behavioral sciences, general medicine and surgery will need to plan for integrated teaching of students for better comprehension and understanding of subject. We have outlined learning outcomes for each discipline along with allocated time to be taught.

Module outcome

- To describe gross and microscopic anatomy of different parts of gastrointestinal system and associated organs
- To describe the embryological development of different parts of gastrointestinal system and associated organs
- To describe the functional anatomy and physiology of different parts of gastrointestinal system and associated organs
- To describe the motility, secretory, and digestive function of gastrointestinal system
- To describe the biochemical aspects of carbohydrate metabolism
- To discuss pathological aspect and management of gastrointestinal related diseases
- To discuss the pharmacological treatment of diarrhea
- To discuss the psychosocial impact of gastrointestinal diseases in society
- To discuss the preventive measures related to gastrointestinal diseases.
- To comprehend concept of balanced diet and malnutrition

Themes

- Oral cavity & Esophagus (O &E)
- Walls of Abdomen & Peritoneum
- Stomach
- Small intestine
- Large intestine (Cecum, Appendix, Colon, Rectum & Anal Canal)
- Liver & Biliary tree
- Pancreas & Spleen
- Nutrition

Clinical relevance

- Diseases of oral cavity, esophagus and stomach
- Diseases of small and large intestine
- Diseases of hepatobiliary system
- Diseases related to malnutrition

Syllabus of GIT & Nutrition-1

NORMAL STRUCTURE				
THEORY				
CODE	GROSS ANATOMY	TOTAL HOURS = 35		
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC	MIT
GIT-A-001	Describe the gross anatomical features of oral cavity with its neurovascular supply and lymphatic drainage	Human Anatomy	Oral Cavity and Oropharynx	LGIS (Large group interactive session)
	Discuss the location, anatomical features, relations and vascular supply of tonsils: nasopharyngeal, palatine and lingual.			LGIS (Large group interactive session)
	Discuss the skeletal framework of hard palate with its neurovascular supply and lymphatic drainage			SGD(Small group discussion)
	Describe the gross anatomical features of soft palate with its neurovascular supply and lymphatic drainage			LGIS (Large group interactive session)
	Describe the attachments, nerve supply and actions of muscles of soft palate			SGD(Small group discussion)
	Describe the structure of tongue with attachments of muscles, blood supply, nerve supply and lymphatic drainage			LGIS (Large group interactive session)
	Discuss the anatomical basis of injury to hypoglossal nerve			SGD(Small group discussion)
	Describe anatomical features, relations and neurovascular supply of parotid gland and its duct, mentioning the structures entering and exiting the gland.			LGIS (Large group interactive session)

	Discuss the clinical correlates of parotid gland: parotiditis, Mumps, Frey's syndrome, parotid duct injury and parotid tumor surgery with its complications.			LGIS (Large group interactive session)
	Describe the Waldeyer's ring.			SGD(Small group discussion)
	Describe anatomical features, relations and neurovascular supply of submandibular and sublingual glands with their ducts.			LGIS (Large group interactive session)
	Name the parts of pharynx giving their extent, anatomical features, structure, neurovascular supply and Lymphatic drainage			LGIS (Large group interactive session)
	Name the pharyngeal constrictor muscles defining their attachments, innervation and structure traversing the gaps between adjacent muscles.			LGIS (Large group interactive session)
GIT-A-002	Describe the planes and quadrants of abdomen	Human Anatomy	Anterior Abdomen Wall	LGIS (Large group interactive session)
	Draw and label the cutaneous innervation and dermatomes of anterior abdominal wall and anterolateral Abdominal wall and describe the clinical correlates (Abdominal pain, Muscle rigidity, Referred pain, anterior abdominal nerve block)			
	Describe the fascia of anterior abdominal wall with its clinical significance			LGIS (Large group interactive session)
	Describe anterolateral Abdominal wall arteries, Veins and Lymphatics and related clinical correlates—Caput Medusae			
	Describe the attachments, nerve supply and actions of muscles of anterior abdominal wall			LGIS (Large group interactive session)
	Identify the muscles of anterolateral abdominal wall on anatomical model and/or cadaver			SGD(Small group discussion)
	Describe the extent, formation and contents of rectus sheath			LGIS (Large group interactive

	Give the formation and extent of inguinal ligament			session)
	Describe the formation of superficial and deep inguinal rings and conjoint tendon			
	Locate the position of superficial and deep inguinal rings on simulated subject or Cadaver			SGD(Small group discussion)
	Describe the extent, boundaries and contents of inguinal canal			
	Define the following hernias: umbilical, epigastric, incisional, Spigelian, lumbar, femoral, internal and inguinal			
	Differentiate between direct and indirect inguinal hernias			LGIS (Large group interactive session)
	Describe the location of abdominal surgical incisions			
	Mark the abdominal incisions on simulated patient/ subject and explain their anatomical basis			SGD(Small group discussion)
	List the structures and coverings of spermatic cord			
GIT-A-004	Trace the horizontal and vertical peritoneal reflections	Human Anatomy	Peritoneum	LGIS (Large group interactive session)
	Describe the relationship of viscera to the peritoneum			
	Describe the gross anatomical features of the following: 1. Mesentery 2. Omentum 3. Peritoneal ligaments 4. Peritoneal fold 5. Peritoneal sac, 6. Recesses, 7. Spaces and 8. Gutters			SGD(Small group discussion)
	Describe the nerve supply of Peritoneum			
				LGIS (Large

	Describe the anatomical basis and manifestations of the following: 1. Peritonitis and ascites 2. Peritoneal adhesions (and adhesiostomy) 3. Abdominal paracentesis			group interactive session) SGD(Small group discussion)
GIT-A-005	Describe the extent of esophagus, its constrictions, neurovascular supply and lymphatic drainage Discuss the anatomical basis of esophageal varices, achalasia and Gastro Esophageal Reflux Disease (GERD)		Esophagus	LGIS (Large group interactive session)
GIT-A-006	Describe the location, position, parts, external and internal structure, relations, vascular and nerve supply and lymphatic drainage of stomach Draw and label a diagram illustrating the lymphatic drainage of Stomach	Human Anatomy	Stomach	SGD(Small group discussion)
	Describe the clinical presentation and the anatomical basis and manifestations of the following conditions: Carcinoma of stomach and peptic ulcers Identify and demonstrate the parts, external and internal features of stomach on anatomical model and cadaver			LGIS (Large group interactive session)
GIT-A-007	Describe the location, position, parts, relations, neurovascular supply and lymphatic drainage of duodenum	Human Anatomy	Small & Large Intestine	LGIS (Large group interactive session)

	Describe the anatomical basis and manifestations of the following conditions: 1. Duodenal Ulcers 2. Ileal diverticulum 3. Diverticulosis 4. Large bowel cancer 5. Appendicitis 6. Volvulus 7. Intussusception			LGIS (Large group interactive session)
	Demonstrate the various positions of appendix			SGD(Small group discussion)
	Identify and demonstrate the Parts and external features of small and large intestines on anatomical model and cadaver			
GIT-A-008	Describe the origin, course, branches (tributaries in case of veins) and distribution of the blood vessels of GIT	Human Anatomy	Liver	LGIS (Large group interactive session)
	Describe the formation, tributaries and drainage of hepatic-portal vein			
	Discuss the sites and vessels contributing in portosystemic anastomosis			
	Describe the clinical picture and anatomical basis for the blockage of porto-systemic anastomosis			
	Identify the blood vessels supplying GIT on anatomical model and cadaver			SGD(Small group discussion)
	Describe location, lobes, important relations, peritoneal ligaments, blood supply, lymphatic drainage, nerve supply, related clinical correlates of liver and subphrenic spaces.	Human Anatomy	Liver	LGIS (Large group interactive session)
GIT-A-009	Describe components of Biliary tree- hepatic duct and bile duct	Human Anatomy	Biliary System	LGIS (Large group interactive session)
	Describe relations, functions, blood supply, lymphatic drainage and nerve supply of Gallbladder			

	Describe related clinical correlates- gall stones, biliary colic, cholecystectomy, gallbladder gangrene			
GIT-A-010	Describe the location, surfaces, peritoneal reflections, relations, neurovascular supply and lymphatic drainage of pancreas	Human Anatomy	Pancreas	LGIS (Large group interactive session)
	Describe the anatomical basis and manifestations of pancreatitis and pancreatic cancer			SGD(Small group discussion)
	Identify the parts of the pancreas			
GIT-A-011	Describe the location, surfaces, peritoneal reflections, relations, neurovascular supply and lymphatic drainage of spleen	Human Anatomy	Spleen	LGIS (Large group interactive session)
	Describe the anatomical basis and manifestations of splenic trauma and splenomegaly			
	Identify the borders, surfaces and Impressions of spleen			SGD(Small group discussion)
	Demonstrate the correct anatomical positioning of spleen			
GIT-A-012	Describe the gross anatomical features, peritoneal relations, blood supply, nerve supply and lymphatic drainage of sigmoid colon, rectum and anal canal	Human Anatomy	Sigmoid Colon, Rectum & Anal Canal	LGIS (Large group interactive session)
	Describe the anatomical basis for Sigmoidoscopy, rectal prolapse, rectal examination, rectal cancer and hemorrhoids			
GIT-A-013	Outline the anatomical basis and surgical treatment plan for the following diseases: 1. Esophageal Injuries 2. Gastric Carcinoma	Human Anatomy integrated with Surgery	Surgical Intervention	LGIS (Large group interactive session)

	3. Intestinal Obstruction 4. Pancreatic Carcinoma 5. Obstructive Jaundice 6. Gall Stones			SGD(Small group discussion)
CODE	EMBRYOLOGY & POST-NATAL DEVELOPMENT	TOTAL HOURS = 08		
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC	MIT
GIT-A-014	Describe the development of tongue	Embryology	Oral Cavity	LGIS (Large group interactive session)
	Describe the embryological basis of tongue tie			LGIS (Large group interactive session)
	Describe the development of palate			LGIS (Large group interactive session)
	Describe the embryological basis of various facial clefts			LGIS (Large group interactive session)
	Identify the parts of the developing tongue and palate			LGIS (Large group interactive session)
GIT-A-015	Describe the formation and divisions of gut tube	Embryology	Foregut	LGIS (Large group interactive session)
	Describe the development of mesenteries			LGIS (Large group interactive session)
	Describe the development of esophagus			LGIS (Large group interactive session)
	Describe the embryological basis of esophageal atresia and/or tracheoesophageal fistula			LGIS (Large group interactive session)
	Describe the development and rotation of stomach			LGIS (Large group interactive

				session)
	Describe the embryological basis of pyloric stenosis			LGIS (Large group interactive session)
	Describe the development of duodenum, liver and gall bladder			LGIS (Large group interactive session)
	Describe the embryological basis of intrahepatic and extrahepatic biliary atresia			LGIS (Large group interactive session)
	Describe the development of pancreas			LGIS (Large group interactive session)
	Describe the embryological basis of annular pancreas			LGIS (Large group interactive session)
GIT-A-016	Describe the development of midgut especially mentioning physiological herniation, rotation, retraction of herniated loops and mesenteries of the intestinal loops	Embryology	Midgut	LGIS (Large group interactive session)
	Describe the embryological basis of the following 1. mobile cecum 2. volvulus 3. retro colic hernia 4. Omphalocele			LGIS (Large group interactive session)
	5. gastroschisis			LGIS (Large group interactive session)
	Describe the embryological basis of Meckel's diverticulum			LGIS (Large group interactive session)
	Describe the embryological basis of; 1. Gut rotation defects 2. Gut atresia and stenosis			LGIS (Large group interactive session)
GIT-A-017	Describe the development of hindgut	Embryology	Hindgut	LGIS (Large group interactive session)

	Describe the embryological basis of; 3. Rectourethral and rectovaginal fistulas 4. Recto anal fistulas and atresia 5. Imperforate anus 6. Congenital megacolon			LGIS (Large group interactive session)
	Identify the parts of the developing foregut, midgut and hindgut originating from the endoderm			LGIS (Large group interactive session)
CODE	MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)	TOTAL HOURS = 07		
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC	MIT
GIT-A-018	Describe the light microscopic structure of; 1. Lips 2. Tongue including lingual papillae and taste buds 3. Oral Cavity (Cheeks, Teeth gums, hard & Soft palate) Describe the histological structure of parotid, submandibular and sublingual glands. Compare and contrast the histological structures of parotid, submandibular and sublingual glands. Describe the serous and mucous acini and give histological differences between the two. Describe the structure and location of serous demilunes. Describe histology of oropharynx	Histology	Oral Cavity & Esophagus	LGIS (Large group interactive session)
	Relate the characteristics of various layers of GIT with their function			LGIS (Large group interactive session)
	Describe the light microscopic structure of esophagus			LGIS (Large group interactive session)

	Tabulate the histological differences between different parts of esophagus			LGIS (Large group interactive session)
	Describe the histological changes associated with reflux esophagitis and Barrett's esophagus			LGIS (Large group interactive session)
GIT-A-019	Describe the light microscopic structure of stomach	Histology	Stomach	LGIS (Large group interactive session)
	Describe the role of parietal cells in pernicious anemia			LGIS (Large group interactive session)
GIT-A-020	Describe the light microscopic structure of 1. Duodenum 2. Jejunum 3. Ileum	Histology	Small Intestine	LGIS (Large group interactive session)
	Discuss the histological basis of celiac disease			LGIS (Large group interactive session)
	Discuss the histological basis of Crohn's disease			LGIS (Large group interactive session)
GIT-A-021	Describe the light microscopic structure of 1. Colon 2. Appendix 3. Rectum Define colorectal cancer, anal abscess, hemorrhoids	Histology	Large Intestine	LGIS (Large group interactive session)
PRACTICAL				
CODE	HISTOLOGY	TOTAL HOURS = 12		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
GIT-A-022	Identify, draw and label the histological sections of Tongue and Lips and enumerate points of identification	Histology Practical	Oral Cavity	Laboratory Practical

GIT-A-023	Identify, draw and label the histological sections of Salivary glands (Submandibular, Sublingual and Parotid)	Histology Practical	Salivary Gland	Laboratory Practical
GIT-A-024	Identify, draw and label the histological structure of the esophagus and enumerate points of identification Identify, draw and label the histological structure of stomach and enumerate points of identification	Histology Practical	Upper GIT	Laboratory Practical
GIT-A-025	Identify, draw and label the histological structure of small intestine (Duodenum, Jejunum, and Ileum) and enumerate points of identification	Histology Practical	Small Intestine	Laboratory Practical
GIT-A-026	Identify, draw and label the histological structure of large intestine and enumerate points of identification	Histology Practical	Large Intestine	Laboratory Practical
GIT-A-027	Identify, draw and label the histological sections of Gall bladder, liver and enumerate points of identification	Histology Practical	Organs associated with GIT	Laboratory Practical
	Identify, draw and label the histological sections of pancreas and enumerate points of identification	Histology Practical	Organs associated with GIT	Laboratory Practical
GIT-A-028	Identify, draw and label the histological sections of Palatine tonsil, appendix, peyer's patches and enumerate points of identification	Histology Practical	Lymphatic tissue associated with GIT	Laboratory Practical
NORMAL FUNCTION				
THEORY				
CODE	MEDICAL PHYSIOLOGY	TOTAL HOURS = 20		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
GIT-P-001	Classify the components of enteric nervous system	Medical Physiology	General Principles of GIT Function - Motility, Nervous	LGIS
	Discuss the location and significance of myenteric plexus			LGIS
	Describe the Meissner's plexus			LGIS

	Differentiate between myenteric and Meissner's plexuses		Control & Blood Flow	LGIS
	Explain the mechanism of developing slow wave			LGIS
	Explain the mechanism of developing spike potential			LGIS
	Enlist the factors that depolarize & hyperpolarize the GIT membrane			LGIS
	Enlist the excitatory & inhibitory neurotransmitters of enteric nervous system			LGIS
	Explain the role of sympathetic & parasympathetic nervous system in controlling GIT function.			LGIS
	Enlist the gastrointestinal reflexes & explain the functions of these reflexes			LGIS
	Enlist the hormones acting on GIT, their stimuli, site of release and actions			LGIS
	Enumerate different types of movements that occur in GIT			LGIS
	Discuss the functions and control of GIT movements			LGIS
	Discuss the effect of gut activity and metabolic factors on GIT blood flow			LGIS
	Explain the nervous control of GIT blood flow			LGIS
GIT-P-002	Trace the reflex arc of mastication	Medical Physiology	Oral Cavity & Esophagus	LGIS
	Explain the process and importance of chewing reflex			LGIS
	Enlist the stages of swallowing			LGIS
	Describe the mechanism of voluntary stage of swallowing			LGIS
	Trace the reflex arc of involuntary stage of swallowing			LGIS
	Enlist the steps involved in involuntary stage of swallowing	Medical Physiology		LGIS
	Explain the effect of swallowing on respiration	Medical Physiology		LGIS

	Discuss the mechanism of esophageal stage of swallowing	Medical Physiology		LGIS
	Enlist causes of dysphagia	Medical Physiology integrates with Surgery		LGIS
	Explain the types and role of different peristalsis originating in esophagus	Medical Physiology		LGIS
	Discuss the role of Lower Esophageal Sphincter (Gastroesophageal)	Medical Physiology		LGIS
	Discuss the pathophysiology of ac Megaesophagus	Medical Physiology		LGIS
	Enlist the features and treatment of achalasia	Medical Physiology		LGIS
GIT-P-003	Explain storage function of stomach	Medical Physiology	Stomach	LGIS
	Describe the basic electrical rhythm of stomach wall	Medical Physiology		LGIS
	Explain the role of pyloric pump and pyloric sphincter in gastric emptying	Medical Physiology		LGIS
	Explain the factors that promote Stomach Emptying	Medical Physiology		LGIS
	Discuss the duodenal (nervous & hormonal) factors that inhibit Stomach emptying	Medical Physiology		LGIS
	Enlist the factors that initiate enterogastric inhibitory reflexes	Medical Physiology		LGIS
	Enumerate the causes, features, and pathophysiology of gastritis	Medical Physiology integrates with Medicine		LGIS
	Explain the physiological basis of each feature of gastritis	Medical Physiology integrates with Medicine		LGIS

	Recommend treatment of gastritis	Medical Physiology integrates with Medicine		LGIS
	Enumerate the causes, features, and pathophysiology of peptic ulcer			LGIS
	Explain the physiological basis of each feature of peptic ulcer			LGIS
GIT-P-004	Enumerate and explain the hormones and movements of small intestine	Medical Physiology	Small Intestine	LGIS
	Explain the term “peristaltic rush”			LGIS
	Explain the functions of ileocecal valve and sphincter			LGIS
	Enumerate the types of intestinal sprue	Medical Physiology integrates with Medicine		LGIS
	Enlist the features of intestinal sprue			LGIS
	Explain the consequences of sprue on the body			LGIS
GIT-P-005	Enumerate the types of movements taking place in colon	Medical Physiology	Large Intestine	LGIS
	Explain the mechanism of developing movements of colon and their control through Gastrocolic and Duodenocolic Reflexes	Medical Physiology		LGIS
	Enlist the defecation reflexes	Medical Physiology		LGIS
	Explain the mechanism of defecation reflex	Medical Physiology		LGIS
	Trace the reflex arc of defecation	Medical Physiology		LGIS
	Name the other autonomic reflexes that affect bowel activity	Medical Physiology		LGIS
	Explain the pathophysiology of constipation	Medical Physiology integrates with Medicine		LGIS
	Discuss the causes of diarrhea	Medical Physiology		LGIS
Describe the cause of Hirschsprung’s disease integrate with Medicine				

GIT-P-006	Explain the functions of liver	Medical Physiology	Liver	LGIS
	Differentiate between liver and gall bladder bile and the hormones acting on them	Medical Physiology		LGIS
	Enumerate the causes and composition of developing gall stones	Medical Physiology Integrate with Surgery		LGIS
GIT-P-007	Explain function and secretions of pancreas	Medical Physiology	Pancreas	LGIS
	Enlist the causes and pathophysiology of acute and chronic pancreatitis	Integrate with Medicine		LGIS
	Enumerate the features of acute pancreatitis and explain the physiological basis of each feature of pancreatitis	Integrate with Medicine		LGIS
GIT-P-008	Describe the stages of vomiting act	Medical Physiology	Vomiting Reflex	LGIS
	Trace the reflex arc of vomiting	Medical Physiology		LGIS
	Explain the role of chemoreceptor trigger zone for initiation of vomiting by drugs or by motion sickness	Medical Physiology		LGIS
GIT-P-009	Define Malnutrition	Integrated with Medicine Gastroenterology	Malnutrition	LGIS
	Identify various causes of malnutrition			LGIS
	Identify the risk factors of malnutrition			LGIS
	Outline treatment strategies			LGIS
GIT-P-010	Define Acute Diarrhea		Acute & Chronic Diarrhea	LGIS
	Define Chronic Diarrhea			LGIS
	Enlist various causes for acute and chronic diarrhea			LGIS
PRACTICAL				
CODE	PHYSIOLOGY PRACTICAL	Total Hours= 6		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	Topic	MIT
GIT-P-011	Demonstrate Cranial nerve V, IX & X testing	Physiology	GIT-P-011	Practical

CODE	BIOCHEMISTRY	TOTAL HOURS = 40		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
GIT-B-001	Give the composition and importance of saliva and related clinical disorder (xerostomia)	Biochemistry	Biochemistry of GIT /GIT secretions & digestion and absorption of dietary carbohydrates	LGIS (Large group interactive session)
	Give the composition and importance of gastric juice with special reference to mechanism of HCl secretion and related clinical disorders (achlorhydria, gastric ulcer)			LGIS (Large group interactive session)
	Give the composition and importance of pancreatic juice, bile and succus entericus and related clinical disorders (pancreatitis, cystic fibrosis, cholelithiasis).			LGIS (Large group interactive session)
	Describe digestion and absorption of dietary carbohydrates along with inherited and acquired disorders (lactose intolerance, sucrase-isomaltase deficiency).			LGIS (Large group interactive session)
GIT-B-002	Elaborate key features of various transport systems for entry of glucose into cells.	Biochemistry	Carbohydrate metabolism / Entry of glucose into cells	LGIS (Large group interactive session)
GIT-B-003	Enlist the hormones that play important roles in regulating carbohydrate metabolism.	Biochemistry	Carbohydrate metabolism / Hormonal control of BSL	LGIS (Large group interactive session)
	Elaborate the metabolic effects of these hormones.			SGD (Small group discussion)
	Infer the consequences of deficiency and excess of these hormones			LGIS (Large group interactive session)
	Describe the glycolytic pathway along with its regulation and significance.			LGIS (Large group

GIT-B-004		Biochemistry	Carbohydrate metabolism/ Glycolysis	interactive session)
	Compare key features of aerobic and anaerobic glycolysis.			SGD
	Calculate the number of ATP produced during aerobic and anaerobic glycolysis.			LGIS (Large group interactive session)
	Explain hemolytic anemia in subjects with pyruvate kinase deficiency based on your biochemical knowledge.			LGIS (Large group interactive session)
	Clearly differentiate between substrate level phosphorylation and oxidative phosphorylation.			SGD (Small Group Discussion)
GIT-B-005	Discuss the metabolic fates of pyruvate.	Biochemistry	Carbohydrate metabolism / Metabolic fates of pyruvate	LGIS (Large group interactive session)
	Describe the transport of pyruvate from cytosol to mitochondria.			LGIS (Large group interactive session)
	Elaborate the reaction catalyzed by pyruvate dehydrogenase complex (PDH) along with regulation and significance.			
	Enlist inherited and acquired causes of lactic acidosis and give biochemical explanation for lactic acidosis in each condition.			
GIT-B-006	Describe the TCA cycle along with regulation & Significance. Calculate the energy yield of TCA	Biochemistry	Carbohydrate metabolism / Krebs's Cycle	LGIS (Large group interactive session)
GIT-B-007	Define gluconeogenesis and enumerate gluconeogenic substrates (precursors)	Biochemistry	Carbohydrate metabolism	LGIS (Large group interactive session)

	Delineate the reactions involved in synthesis of glucose from various gluconeogenic substrates.		Gluconeogenesis	LGIS (Large group interactive session)
	Elaborate the regulation and importance of gluconeogenesis.			SGD (Small Group Discussion)
	Explain the significance of Cori cycle and glucose alanine cycle			LGIS (Large group interactive session)
GIT-B-008	Illustrate the reactions of glycogenesis, glycogenolysis along with their regulation and significance	Biochemistry	Carbohydrate metabolism/ Glycogen metabolism	LGIS (Large group interactive session)
	Enlist various types of glycogen storage diseases (GSDs)			LGIS (Large group interactive session)
	Infer the key biochemical and clinical features of various GSDs from the respective enzyme deficiencies.			LGIS (Large group interactive session) & SGD (Small Group Discussion)
GIT-B-009	Describe the reactions and regulation of Hexose Mono Phosphate Pathway (HMP).	Biochemistry	Carbohydrate metabolism/ HMP Hexose Monophosphate Pathway	LGIS (Large group interactive session)
	Discuss the importance of HMP shunt			LGIS (Large group interactive session)
	Explain hemolytic anemia in subjects suffering from G6PD deficiency			LGIS (Large group interactive session)
	Diagnose G6PD (glucose-6-phosphate dehydrogenase) deficiency based on given data.			SGD (Small Group Discussion)

GIT-B-010	Describe the reactions, regulation, and biomedical importance of uronic acid pathway and sorbitol pathway	Biochemistry	Carbohydrate metabolism/Uronic acid pathway & sorbitol pathway	LGIS (Large group interactive session)
GIT-B-011	Outline the reactions involved in metabolism of galactose and fructose.	Biochemistry	Carbohydrate metabolism / Metabolism of galactose & fructose	LGIS (Large group interactive session)
	Infer the key biochemical and clinical features of galactosemia, essential fructosuria, and hereditary fructose intolerance (HFI) from the respective enzyme deficiencies.			LGIS (Large group interactive session)
	Explain hypertriacylglycerolemia, hypercholesterolemia, and hyperuricemia associated with fructose loading of liver.			LGIS (Large group interactive session)
GIT-B-012	Outline the reactions involved in ethanol metabolism.	Biochemistry	Carbohydrate metabolism / Ethanol metabolism	LGIS (Large group interactive session)
	Explain how ethanol consumption causes hypoglycemia and fatty liver.			SGD (Small Group Discussion)
GIT-B-013	Diagrammatically illustrate the organization of electron transport chain (ETC) depicting the flow of electrons	Biochemistry	Respiratory chain & oxidative phosphorylation / ETC	LGIS (Large group interactive session)
	Enlist the components of complex I, II, III, and IV			LGIS (Large group interactive session)
	Enumerate clinically important inhibitors of electron transport chain and mention their site of action.			LGIS (Large group interactive session)
	Elaborate the structure of ATP synthase (complex V).			LGIS (Large group interactive session)

GIT-B-014		Biochemistry	Respiratory chain & oxidative phosphorylation /ATP synthesis	group interactive session)
	Explain how the free energy generated by the transport of electrons by ETC is used to produce ATP from ADP + Pi (i.e. chemiosmotic hypothesis)			LGIS (Large group interactive session)
	Elaborate the effect of oligomycin and uncouplers on ATP production.			SGD (Small Group Discussion)
	Describe the effect of arsenic poisoning on Carbohydrate metabolism and ATP production.			LGIS (Large group interactive session)
	Elaborate the glycerol 3-P shuttle and malate-Aspartate shuttle for the transfer of reducing equivalents From cytosol into the mitochondria.			LGIS (Large group interactive session)
GIT-B-015	Define and classify nutrients into macro and micronutrients.	Biochemistry	Nutrition/ Balanced diet	LGIS (Large group interactive session)
	Elaborate the concept and importance of Balanced Diet			SGD (Small Group Discussion)
	Enlist the components of balanced diet and elaborate the importance of each component.			LGIS (Large group interactive session)
GIT-B-016	Delineate special nutritional requirements during pregnancy, lactation, growth, and old age.	Integrate with Community Medicine	Nutrition/ Special nutritional requirements	LGIS (Large group interactive session)
	Suggest dietary advice for patients suffering from diabetes mellitus, hypertension, obesity, renal disease, lactose intolerance, gluten enteropathy, hypercholesterolemia, and hemorrhoids.			Presentation s
	Enlist causes and types of Protein Energy Malnutrition (PEM).	Integrate with community	Nutrition	LGIS (Large group interactive session)

GIT-B-017	Differentiate between Kwashiorkor and Marasmus based on the given data Enlist symptoms and signs Outline treatment strategies	Medicine/ Pediatrics	on/ PE M	LGIS (Large group interactive session)
GIT-B-018	Define energy balance.	Biochemistry	Nutrition/ Caloric requirements	LGIS (Large group interactive session)
	Compare the energy content of macro nutrients and alcohol.			LGIS (Large group interactive session)
	Suggest a simple method for estimation of caloric requirements of sedentary adults, moderately active adults, and very active adults			SGD (Small Group discussion)
GIT-B-019	Define basal metabolic rate (BMR)	Biochemistry	Nutrition/ BMR	LGIS (Large group interactive session)
	Elaborate the effect of various physiological and pathological factors on BMR.			LGIS (Large group interactive session)
GIT-B-020	Define body mass index (BMI).	Integrate with community Medicine	Nutrition/ BMI & Obesity	LGIS (Large group interactive session)
	Categorize individuals into underweight, normal, overweight, obese, and morbidly obese based on their BMI values.			LGIS (Large group interactive session)
	Elaborate the role of genetic, environmental, and behavioral factors in determining body weight.			SGD (Small Group Discussion)
	Clearly differentiate between upper body obesity and lower body obesity.			LGIS (Large group interactive session)
	Enlist health risks associated with obesity.			SGD (small group)

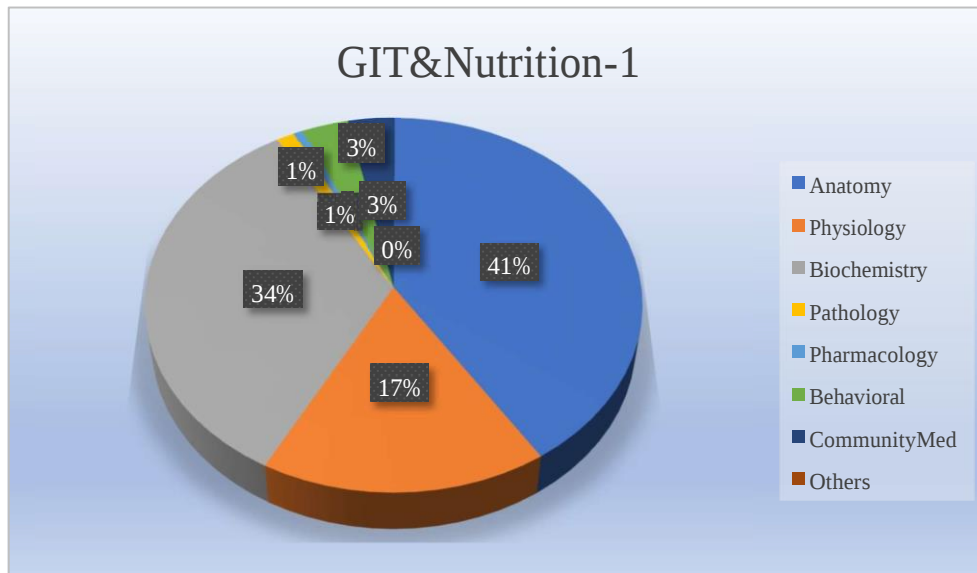
				discussion
GIT-B- 021	Describe sources, Recommended Dietary Allowance (RDA), biochemical functions, deficiency, and toxicity of vitamin B1, B2, B3, B5 and B7.	Biochemistry	Vitamins/ Energy releasing vitamins & vitamin E and K	LGIS (Large group interactive session)
	Describe sources, RDA, biochemical functions, deficiency, and toxicity of vitamin E and vitamin K.			LGIS (Large group interactive session)
GIT-B- 022	Define and classify minerals according to their daily requirements.	Biochemistry	Minerals	LGIS (Large group interactive session)
	Give sources, functions and biomedical importance of Na, K and Cl.			LGIS (Large group interactive session)
	Describe sources, functions and biomedical importance of Mg, Se, I, F, Cu, Cr, Mn, Mo, Zn and Co.			LGIS (Large group interactive session)
GIT-B- 023	Define Marasmus and Kwashiorkor	Integrated with Pediatrics	Malnutrition	SGD (Small Group Discussion)
GIT-B- 024	Define Acute Hepatitis Define Chronic Hepatitis	Integrated with Medicine Gastroenterology	Acute & Chronic Hepatitis	LGIS (Large group interactive session)
	Enlist various causes for acute and chronic hepatitis			SGD (Small Group Discussion)
	Describe various symptoms and signs of chronic hepatitis			SGD (Small Group Discussion)
	Outline treatment strategies			SGD (Small Group Discussion)

PRACTICAL				
CODE	BIOCHEMISTRY	TOTAL HOURS = 11+06		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
GIT-B-025	Estimate blood glucose level by glucose oxidase method and interpret the results	Biochemistry Practical	Estimations of blood/urine analytes	Practical
	Determine blood glucose level by glucometer and interpret the result.			Practical
	Perform Glucose tolerance test (GTT) and interpret the results.	Biochemistry Practical		Practical
	Determine urine glucose by dipstick method and interpret the result.			Practical
	Estimate serum amylase and interpret the result.			Practical
GIT-B-026	Interpret the results of Lactose tolerance test.		Interpretation of results	Practical
GIT-B-027	Determine BMI of given subject and interpret the results.		Determination & interpretation of results	Practical
AGING				
CODE	THEORY	TOTAL HOURS = 01		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
GIT-CM-001	Identify causes and risk factors for malnutrition in elderly	Community Medicine	Preventive Medicine in Geriatrics	LGIS
	Outline treatment strategies			LGIS

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS				
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 03		
		DISCIPLINE	TOPIC	MIT
GIT-Ph-001	Classify anti diarrheal drugs and describe the pharmacokinetics, mechanism of action, pharmacological effects, uses and adverse effects	Pharmacology	Anti Diarrheal Drugs	LGIS
GIT-Pa-001	Describe the etiology, pathogenesis, morphology and clinical features of peptic ulcer disease	Pathology	Peptic Ulcer	LGIS
GIT-Pa-002	Enumerate common infectious agents of diarrheal diseases Discuss pathogenesis and clinical features of common pathogens	Pathology	Infectious agents causing Diarrhea	LGIS
DISEASE PREVENTION & IMPACT				
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 09		
		DISCIPLINE	TOPIC	MIT
GIT-BhS001	Identify health related behaviors and apply principles of learning to modify eating and addictive patterns	Behavioral Sciences	Health related behaviors	LGIS
GIT-BhS002	Discuss health belief model and its application in managing common presentations related to gastrointestinal system		Health related believes	LGIS
	Explain the transtheoretical model of changing behaviors to modify the diseases pattern			LGIS
GIT-BhS003	Describe motivational interviewing and outline a management plan to help the individuals with obesity and diabetes to lose weight		Management of Obesity	LGIS
GIT-BhS004	Describe and distinguish Medically Un described Symptoms (MUS)		Medically Un described Symptoms	LGIS

	Describe the association of psychosocial factors with MUS			LGIS
	Outline the principles of management plan according to biopsychosocial model			LGIS
	Describe role of Cognitive Behavioral Therapy (CBT)			LGIS
GIT-BhS005	To identify effect on mental development of nutritional deficiencies		Role of nutritional deficiencies in mental development	LGIS
GIT-CM-001	Describe prevention and control of polio, viral hepatitis A, cholera, typhoid and food poisoning	Community Medicine	Epidemiology of communicable diseases (Intestinal infection)	LGIS
	Describe prevention and control ascariasis, hook worm infestation			LGIS
GIT-CM002	Describe the advice to be given for breast feeding, weaning and childhood		Preventive medicine in pediatrics	LGIS
	Discuss risk factors, prevention and management of protein energy malnutrition (PEM)			LGIS
GIT-CM003	Describe balanced diet for adult and obesity		Nutrition & Health	LGIS
	Plot and interpret growth chart for children under 5 years of age			LGIS
	Describe prevention and control of deficiency of Vitamin A and D			LGIS

Distribution and duration of teaching hours amongst disciplines



Module Weeks	Recommended Minimum Hours
06	152

MODULE 07

RENAL 1

Module rationale

The renal module for second-year MBBS (Bachelor of Medicine, Bachelor of Surgery) students is a crucial component of the medical curriculum. This module is designed to provide students with a comprehensive understanding of the structure, function, and pathology of the kidneys, as well as the principles of renal physiology and the clinical management of and electrolyte balance, acid-base balance, and blood pressure. Understanding renal physiology is essential for comprehending various disease renal disorders. Here are some key rationales for including a renal module in the curriculum:

Module outcome

- Discuss the gross and microscopic anatomy of kidney and urinary system.
- Explain the embryological development of kidney and urinary tract
- Explain common developmental abnormalities of renal system
- Identify role of renal system in maintaining blood pressure and acid base balance
- Enlist functions of kidney and pathologies related to them.
- Explain method of electrolyte balance and pathologies related to it.
- Highlight pathologies related to kidneys and their distinctive clinical features
- Interpret investigations done to diagnose abnormal structural and functional presentations.

Themes

- Kidney
- Ureter
- Bladder
- Acid/base balance

Clinical relevance

- Protein in urine.
- Kidney stones.
- Kidney pain.
- Blood in urine (hematuria)
- Kidney infection.
- Acute kidney injury (AKI)
- Kidney cancer.
- Dialysis
- Control of blood pressur

Syllabus of Module 07

Renal -1

NORMAL STRUCTURE

THEORY

CODE	GROSS ANATOMY	TOTAL HOURS = 14		
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC	MIT
R-A-001	Describe gross features and facial coverings of kidneys.	Human Anatomy	Kidney	LGIS (Large group interactive session)
	Compare and contrast the relations of right and left kidneys.			LGIS (Large group interactive session)
	Describe blood supply, lymphatics and nerve supply of kidney			SGD(Small group discussion)
	Discuss the clinical aspects of kidneys			
	Demonstrate the surface marking and radiographic anatomy of kidney. Identify the side of kidney			
R-A-002	Compare and contrast the relations of right and left ureter	Human Anatomy	Ureter	LGIS (Large group interactive session)
	Give the constrictions of ureter			SGD(Small group discussion)
	Describe the blood supply nerve supply and lymphatics of ureter			
	Identify the ureter.			
R-A-003	Describe the gross anatomical features, relations, surfaces, blood supply, nerve supply and lymphatics of urinary bladder	Human Anatomy	Urinary bladder	LGIS (Large group interactive session)
	Give the clinical correlates of urinary bladder			SGD(Small group discussion)
	Identify the gross features and surfaces of urinary bladder			

R-A-004	Interpret basic urological signs/symptoms & investigations.	Integrate with urology	Sign/symptom/investigations	SGD(Small group discussion)
R-A-005	Describe the etiology, and management of urinary retention.		Urinary retention	LGIS (Large group interactive session)
R-A-006	Identify and describe the various anatomic landmarks of the renal system on radiographs	Integrate with Radiology	radiograph	SGD(Small group discussion)
R-A-007	Describe the parts of urethra.	Human Anatomy	Urethra	LGIS (Large group interactive session)
CODE	EMBRYOLOGY & POST-NATAL DEVELOPMENT	TOTAL HOURS = 05		
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC	MIT
R-A-008	Describe development of intermediate mesoderm and its derivatives	Embryology	Development of urinary system	LGIS (Large group interactive session)
	Describe the development of pronephros, mesonephros and metanephros	Embryology		LGIS (Large group interactive session)
	Describe positional changes during descent of kidney with correlation to its blood supply	Embryology		LGIS (Large group interactive session)
	Describe the development of urinary bladder and urethra	Embryology		LGIS (Large group interactive session)
	List and describe the common congenital anomalies of kidney, urinary bladder and urethra.	Embryology		LGIS (Large group interactive session)
CODE	MICROSCOPIC STRUCTURE	TOTAL HOURS = 04		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
R-A-009	Describe the histological, structural organization and functions of kidney with clinicals.	Histology	Structure of kidney	LGIS (Large group interactive session)
R-A-010	Describe the light and ultrastructure of Juxtaglomerular apparatus and glomerular filtration barrier	Histology	Juxtaglomerular apparatus	LGIS (Large group interactive session)
R-A-011	Describe the histological structure of ureter	Histology	Structure of ureter	LGIS (Large group interactive session)

R-A-012	Describe the histological structure of urinary bladder Discuss clinical correlates (Cystitis, Urinary bladder cancer, Urinary Tract Infections (UTIs))	Histology	Structure of urinary bladder	LGIS (Large group interactive session)
PRACTICAL				
CODE	HISTOLOGY	TOTAL HOURS = 06		MIT
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	
R-A-013	Identify and draw and label the histological structure of kidney and enumerate points of identification	Practical	Kidney	SGD (Small group discussion)
R-A-014	Identify, draw and label the histological structure of ureter and enumerate its points of identification	Practical	Ureter	SGD (Small group discussion)
R-A-015	Identify, draw and label the histological structure of urinary bladder and enumerate its points of identification	Practical	Urinary bladder	SGD (Small group discussion)
NORMAL FUNCTION				
THEORY				
CODE	MEDICAL PHYSIOLOGY	TOTAL HOURS = 36		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
R-P-001	Describe major composition of intracellular and extracellular fluids	Physiology	Body fluid compartment	LGIS
	Define Hypo and hypernatremia			LGIS
	Explain the causes of hypo & hypernatremia and their effects on Composition of body fluid compartments			LGIS
	Describe difference between iso-osmotic, hyperosmotic, hypo-osmotic fluids			LGIS
R-P-002	Enumerate causes of Intracellular and extracellular edema	Integrate with Medicine	Edema	LGIS
	Describe safety factors that prevent edema			LGIS
R-P-003	Explain the functions of the kidney	Physiology	Function	LGIS

R-P-004	Describe the mechanism of micturition and its control		Micturition reflex	LGIS
	Explain the role of higher center on micturition			LGIS
	Explain the physiological anatomy and innervation of bladder			LGIS
	Discuss the voluntary control of micturition			LGIS
R-P-005	Explain the causes, pathophysiology, and features of atonic bladder. Discuss the causes, pathophysiology, and features of automatic bladder. Write the causes, pathophysiology, and features of uninhibited neurogenic bladder	Integrate with Pathology	Abnormalities of micturition	LGIS
R-P-006	Enlist the steps of urine formation	Physiology	Urine formation	LGIS
	Explain the physiological anatomy and functions of glomerular capillary membrane			LGIS
	Discuss the composition of filtrate			LGIS
	Explain the minimal change nephropathy and increase permeability to plasma protein			LGIS
R-P-007	Define Glomerular Filtration Rate (GFR).	Physiology	Glomerular filtration	LGIS
	Describe the determinants of GFR			LGIS
	Explain the factors affecting GFR			LGIS
	Discuss the hormones and autocooids that affect GFR			LGIS
	Explain mechanisms of autoregulation of GFR			LGIS
	Enlist the physiological and pathological factors that decrease GFR			LGIS
	Explain the effects of angiotensin II blocker on GFR during renal hypoperfusion			LGIS

R-P-008	Enumerate different types of transport along the kidney tubules for reabsorption	Physiology	Reabsorption	LGIS
	Explain the reabsorption and secretion along different parts of the Nephron			LGIS
	Explain the regulation of tubular reabsorption			LGIS
	Discuss the forces / pressure and hormones that			LGIS
	determine renal tubular reabsorption			LGIS
	Explain the reabsorption of water along different parts of nephron			LGIS
	Define obligatory and facultative reabsorption			LGIS
	Discuss the characteristics of late distal tubules and cortical collecting ducts			LGIS
	Discuss the characteristics of medullary collecting ducts			LGIS
R-P-009	Explain the use of clearance method to quantify kidney function	Physiology	Clearance method	LGIS
R-P-010	Describe mechanism of re-absorption of sodium along different parts nephrons	Physiology	Transport maximum	LGIS
	Define and explain the term Transport maximum for the substances			LGIS
	Define filtered load for the substance			LGIS
	Justify the difference of transport maximum and renal threshold of glucose in renal tubules			LGIS
R-P-011	Explain the renal mechanisms for excreting Dilute urine	Physiology	Urine concentration and dilution	LGIS
	Explain the mechanism for forming a concentrated urine			LGIS
	Discuss the role of urea in the process of counter current multiplier mechanism			LGIS

	Describe the countercurrent exchange in vasa Recta to preserve hyperosmolarity of renal medulla			LGIS
R-P-012	Define and explain the term obligatory urine volume. Define and explain free water clearance. Define Urine specific gravity.	Physiology	Obligatory urine volume	LGIS
R-P-013	Enumerate different abnormalities of urinary concentrating ability	Physiology	Disorders of urine concentrating ability	LGIS
R-P-014	Enumerate the types of Diabetes insipidus	Integrate with	Diabetes	LGIS
	Enlist the features of diabetes insipidus	Medicine	insipidus	LGIS
	Explain the pathophysiology and treatment of central diabetes insipidus			LGIS
	Discuss the pathophysiology of nephrogenic diabetes insipidus			LGIS
R-P-015	Make the flow chart to show the Osmoreceptorantidiuretic hormone (ADH) feedback mechanism for regulating extracellular fluid osmolarity in response to a water deficit.	Physiology	Osmoreceptor-ADH Feedback System	LGIS
	Enlist the factors which increase and decrease the release of ADH			LGIS
R-P-016	Explain the mechanism of thirst	Physiology	Thirst	LGIS
				LGIS
R-P-017	Enumerate the factors that can alter potassium distribution between intracellular and extracellular fluids		Renal regulation of potassium	LGIS
	Discuss the process of secretion of potassium by renal tubules Explain the regulation of internal potassium distribution and potassium secretion			LGIS

R-P-018	Explain the control of extracellular fluid osmolarity and sodium concentration		Control of ECF osmolarity	LGIS
R-P-019	Explain the integration of renal mechanism for control of Extracellular Fluid (ECF)		Control of ECF	LGIS
	Explain the importance of pressure natriuresis and diuresis in maintaining body sodium and fluid balance			LGIS
R-P-020	Explain the renal handling of calcium concentration to regulate plasma calcium concentration		Renal regulation of calcium Renal regulation of phosphate	LGIS
	Enumerate the factors that alter renal calcium			LGIS
	Enlist the factors that alter renal phosphate excretion			LGIS
R-P-021	Explain the nervous and hormonal factors that increase the effectiveness of renal body fluid feedback control	Physiology	Renal body fluid feedback control	LGIS
R-P-022	Explain the conditions that cause large increase in blood volume and ECF volume		ECF and blood volume	LGIS
	Explain the conditions that cause large increase ECF volume but with normal blood volume			
R-P-023	Explain the renal handling of H ⁺ ion.		Acid base balance	LGIS
R-P-024	Analyze the acid base disturbances on the basis of pH, HCO ₃ and CO ₂	Physiology	Acid base disturbance	LGIS
	Explain the causes and compensation of metabolic acidosis			LGIS
	Explain the causes and compensation of metabolic alkalosis			LGIS
	Explain the causes and compensation of respiratory acidosis			LGIS

	Explain the causes and compensation of respiratory alkalosis			LGIS
	Explain the causes and compensation of mixed acid base disorder			LGIS
R-P-025	Define and explain anion gap	Physiology	Anion gap	LGIS
CODE	MEDICAL BIOCHEMISTRY	TOTAL HOURS = 23		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
R-B-001	Describe digestion and absorption of dietary proteins along with the inherited and acquired disorders (peptic ulcer, Hartnup disease, gluten enteropathy and cystic fibrosis). Elaborate the mechanisms involved in renal reabsorption of amino acids and discuss related disorders (Hartnup disease and cystinuria)	Medical Biochemistry	Protein digestion and absorption, reabsorption, and related disorders	LGIS (Large group interactive session)
R-B-002	Clearly differentiate between protein digestion and degradation.	Medical	Protein	LGIS (Large group interactive session)

	Compare the salient feature of the two major mechanisms for degradation of body proteins. Elaborate the concept of protein turnover and quote examples of short lived and long-lived proteins.	Biochemistry	Metabolism/ Protein degradation and turnover	
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R-B-003	Define amino acid pool. Delineate the sources and fates of amino acids. Give definition of nitrogen balance and its three states. Give physiological and/or pathological conditions associated with each state of nitrogen balance.	Medical Biochemistry	Protein Metabolism/ Amino acid pool and nitrogen balance	LGIS (Large group interactive session)
R-B-004	Enlist 7 important reactions involved in amino acid metabolism and give a brief introduction of each. (Deamination, Transamination, Trans-deamination, Deamidation, Decarboxylation, Transmethylation & Transpeptidation)	Medical Biochemistry	Protein Metabolism/ Introduction to Reactions involved in catabolism	LGIS (Large group interactive session)
R-B-005	Define transamination. Describe the reactions catalyzed by ALT (alanine transaminase) and AST (aspartate aminotransferase) with special reference to the role of pyridoxal phosphate in the transfer of amino group. Give diagnostic and prognostic importance of serum ALT and AST. Elaborate the importance of transamination reaction in amino acid metabolism.	Medical Biochemistry	Protein Metabolism/ Transamination	LGIS (Large group interactive session)
R-B-006	Define oxidative deamination. Describe the reaction catalyzed by glutamate dehydrogenase (GDH) along with its significance.	Medical Biochemistry	Protein Metabolism/ Trans deamination	LGIS (Large group interactive session)
	Define trans deamination.			

R-B-007	Define deamidation. Describe deamidation reaction catalyzed by glutaminase and asparaginase along with their significance. Explain how does L-asparaginase help in the management of certain types of leukemia. Elaborate the mechanism for shunting of glutamine from liver to kidneys during acidosis. Give advantage of shunting.	Medical Biochemistry	Protein Metabolism/ Deamidation	LGIS (Large group interactive session)
R-B-008	Define decarboxylation. Describe important decarboxylation reactions along with their significance	Medical Biochemistry	Protein Metabolism/ Decarboxylation	LGIS (Large group interactive session)
R-B-009	Give sources of ammonia in human body. Describe how ammonia is transported to liver with special reference to the role of glutamine and alanine in this transport mechanism.	Medical Biochemistry	Protein Metabolism/ Sources and transport of ammonia	LGIS (Large group interactive session)
R-B-010	Elaborate the reactions and regulation of urea cycle. Enlist the inherited and acquired causes of hyperammonemia in each condition. Give the biochemical mechanisms underlying ammonia intoxication. Discuss dietary and therapeutic measures for the management of patients with hyperammonemia (phenylbutyrate, lactulose, antibiotics).	Medical Biochemistry	Protein Metabolism/ Urea cycle, ammonia intoxication and its management	LGIS (Large group interactive session)
R-B-011	Trace the pathways for synthesis of non-essential amino acids (NEAA) (alanine, aspartate, glutamate, glutamine, asparagine, proline, serine, glycine, cysteine, and tyrosine)	Medical Biochemistry	Protein Metabolism/ Biosynthesis of NEAA	LGIS (Large group interactive session)

R-B-012	Discuss the fate of carbon skeletons of amino acids. Categorize amino acids into glucogenic, ketogenic or both depending upon the intermediates produced during their catabolism. Outline the catabolic pathways of amino acids that yield oxaloacetate. Outline the catabolic pathways of amino acids that yield α-ketoglutarate. Outline the catabolic pathways of amino acids that yield pyruvate. Outline the catabolic pathways of amino acids that yield fumarate. Outline the catabolic pathways of amino acids that yield succinyl CoA. Outline the catabolic pathways of amino acids that yield acetyl CoA or acetoacetyl CoA.	Medical Biochemistry	Protein Metabolism/ Degradation of carbon skeleton of amino acids	LGIS (Large group interactive session)
R-B-013	Describe the metabolism of methionine. Discuss cause, Key diagnostics features and management of homocystinuria.	Biochemistry/ integrate with Pediatrics	Protein Metabolism/ Inborn errors of amino acid metabolism	LGIS (Large group interactive session)
	Describe the catabolism of branched chain amino acids. Discuss cause, key diagnostic features, and management of Maple Syrup Urine disease	Biochemistry/ integrate with Pediatrics		
	(MSUD).			

	Describe the metabolism of tyrosine. Discuss the cause, key diagnostic features, and management of alkaptonuria, albinism, and type 1 tyrosinemia.	Biochemistry/ integrate with Pediatrics		LGIS	
	Give cause, key diagnostic features, and management of phenylketonuria (PKU)	Biochemistry/ integrate with Pediatrics			
	Elaborate special roles of glycine, tryptophan, phenylalanine, tyrosine, and methionine	Biochemistry			
R-B-014	Describe ionization of water and elaborate its significance. Discuss water and electrolyte balance in health and disease.		Water, pH, Buffers/ Ionization of water	LGIS (Large group interactive session)	
R-B-015	Define pH and describe the concept of pH scale.		Biochemistry	Water, pH, Buffers/ pH and pH scale	LGIS (Large group interactive session)
R-B-016	Define weak acids and conjugate base.			Water, pH, Buffers/ weak acids and their significance	LGIS (Large group interactive session)
R-B-017	Define Ka and pKa and give their significance.	Water, pH, Buffers/ Ka And pKa		LGIS (Large group interactive session)	
R-B-018	Describe Henderson-Hasselbach (HH) equation. (no derivation required) along with its application/use.	Water, pH, Buffers/ HH equation and its applications		LGIS (Large group interactive session)	

R-B-019	Define buffers. Enumerate the component of a buffers system and describe their mechanism of action. Enlist important buffers present in blood, plasma, ECF (Extra Cellular Fluid), ICF (Intra Cellular Fluid) and renal tubular fluid. Elaborate the working of bicarbonate buffer and phosphate buffer.		Water, pH, Buffers/ HH equation and its applications	LGIS (Large group interactive session)
R-B-020	Elaborate the role of kidneys in the regulation of acid base balance.	Biochemistry	Acid Base balance and imbalance/ Renal mechanisms for pH regulation	LGIS (Large group interactive session)
R-B-021	Elaborate the concept of 1 st , 2 nd and 3 rd line of defense against changes in H ⁺ ion concentration.		Acid Base balance and imbalance/ Defense mechanisms against changes in H ⁺ concentration	LGIS (Large group interactive session)

R-B-022	Define acidosis and alkalosis. Classify acid base disorders. Enlist causes of metabolic acidosis and give its compensation. Enlist causes of respiratory acidosis and give its compensation. Enlist causes of metabolic alkalosis and give its compensation. Enlist causes of respiratory alkalosis and give its compensation.	Biochemistry/integrate with Medicine	Acid Base balance imbalance/ Types of acid base disorders	LGIS (Large group interactive session)
R-B-023	Interpret disorders metabolic and respiratory disorders of acid base balance on basis of sign, symptoms and arterial blood gas (ABG) findings Give biochemical explanation for tetany associated with alkalosis	Biochemistry	Acid Base balance imbalance/ Tetany in alkalosis	LGIS (Large group interactive session)
PRACTICAL.				
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 02+10=12		
		DISCIPLINE	TOPIC	MIT
R-P-026	Perform a complete examination of the urine sample URS-10 (using urine reagent-10) and interpret its report	Physiology Practical	Interpretation of report	Practical
	Determine the specific gravity of urine			
R-B-024	Estimate blood urea level and interpret your results.	Biochemistry Practical	Interpretation of results	Practical

Estimate serum creatinine level and interpret your results. Compare the usefulness of blood urea and serum creatinine in assessment of renal functions.			
Determination of proteins in urine by dipstick method and interpret your results.			
Estimate serum acid phosphatase level and interpret your results.			

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 13		
		DISCIPLINE	TOPIC	MIT
R-Ph-001	Classify diuretics & carbonic anhydrase inhibitor. MOA, clinical uses, and adverse effects	Pharmacology & Therapeutics	Diuretics	LGIS
	Describe Thiazide & loop diuretics their Mechanism of Action, clinical uses, and adverse effects.			LGIS
	Describe Potassium sparing and osmotic diuretics their mechanism of action, clinical uses, and adverse effects.			
R-Pa-001	Discuss the etiology and pathogenesis of different types of stones.	Pathology	Renal Stones	LGIS
R-Pa-002	Identify the causes, morphological aspect & outcome of hydronephrosis.		Hydronephrosis	LGIS
R-Pa-003	Enlist common causative agents of urinary tract infections and describe pathogenesis and clinical features of common causative agents of UTI.		UTI causative agents	LGIS
R-Pa-004	Define various presentations of glomerulonephritis. Define nephrotic and nephritic syndrome. List various risk factors and outline	Integrate with Medicine	Glomerulonephritis	LGIS

	management of glomerulonephritis.			
R-Pa-005	Define AKI (acute kidney injury) Identify various risk factors and causes for AKI. Outline management strategies.		Acute Kidney Injury	LGIS
R-Pa-006	Define UTI (Urinary Tract Infection)		Urinary tract infection	LGIS
	Identify various risk factors and causes of UTI.			LGIS
	Describe signs and symptoms of UTI.			LGIS
	Outline management strategies.			

DISEASE PREVENTION AND IMPACT

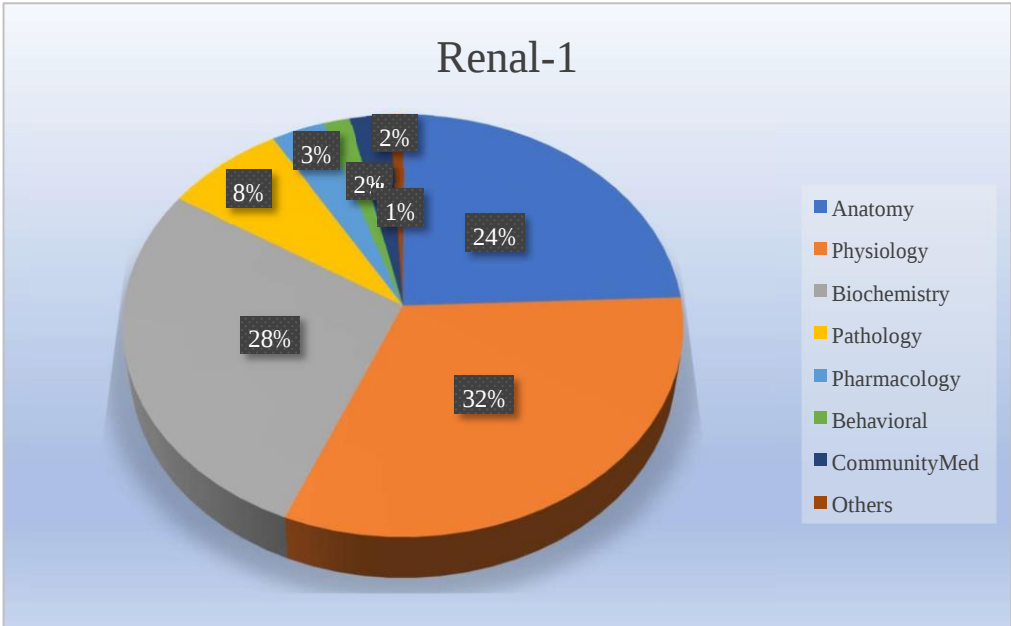
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 04		
		DISCIPLINE	TOPIC	MIT
R-CM-001	Discuss the significance of quality of life in disease and treatment settings. Measures of health status. Disability-Adjusted Life Year (DALY) and Quality-Adjusted Life Year (QALY) Life expectancy.	Community Medicine and Public Health	Quality of life	SDL
R-BhS-001	To identify the behavioral abnormalities caused by renal function.	Behavioral Sciences	Dementia, uremic encephalopathy, delusion, muscle paralysis & Societal impact	SDL
	To identify the cognitive abnormality.			
	To identify the dangers for the patient, his family, and society.			

AGING

CODE	THEORY	TOTAL HOURS = 02	
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	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
R-Ag-001	To define preventive care in diseases related to urinary system(adults). Primary, secondary, and tertiary prevention.	Community	Disease prevention	SDL
R-Ag-002	Define urinary incontinence. Outline management strategies.	Medicine	Urinary incontinence	SDL

Distribution and duration of teaching hours amongst disciplines



Module Weeks	Recommended Minimum Hours
04	119

Modes of Information Transfer

Problem Based Learning (PBL)

It is an instructional student-centered approach in which students work in small groups on a health problem, identifying their own educational needs and being responsible for the acquisition of the knowledge required to understand the scenario.

Significance of its usage

- Teamwork
- Critical evaluation of literature
- Self-directed learning and use of resources
- Presentation skills
- Leadership
- Respect for colleagues views

Case Based Learning (CBL)

It is an inquiry structured learning experience utilizing live or simulated patient cases to solve, or examine a clinical problem, with the guidance of a teacher and stated learning objectives.

Significance of its usage

- Induce a deeper level of learning by inculcating critical thinking skills. Flexibility on use of case
- Helps students acquire insight full information.
- Stay a breast with novel advancements in health care

Small Group Discussion (SGD)

SGD is a class or short series of classes, in which one or more instructors provides intensive instruction on some subject to a small group. Its purpose is to explore view for discussion. Students point of allowing time and including self-directed, reflective learning skills

Significance of its usage

Develop and assess the extent of back ground knowledge of students, which enables them to properly understand concepts which may not have been understood in lectures.

Develop problem-solving skills. Develop practice of self-learning. Reduced time to understand the topic.

Reflective Writing

It is a meta-cognitive process that occurs before, during and after the situation with the purpose of developing greater understanding of both the self and situation so that future encounters with the situation are informed from previous encounters.

Significance of its usage

- Questioning attitude and new perspectives.
- Areas for change and improvement.
- Respond effectively to new challenges.
- Critical thinking and coping skills

Bedside Teaching

Teaching and learning that occurs with actual patient as the focus. It occurs in wards, emergency departments, operating rooms, and high dependency units.

Significance of its usage

- Stimulus of clinical contact
- Psychomotor skills
- Communication skills
- Language Skills
- Interpersonal skills
- Professional attitudes and empathy

- Role modeling

Skills Laboratories

It refers to specifically equipped practice rooms functioning as training facilities offering hands on training for the practice of clinical skills within non-threatening environment prior to their real-life application. This applies to both basic clinical skills as well as complex surgical skills.

Significance of its usage

- Controlled, anxiety-free, and risk-free learning environment to students.
- A platform for repeated practice for mastery in relevant clinical skills. Increase the preparedness of student learners before transitioning to the real hospital setting.
- Build strong communication skills.
- Enable learner to make critical decisions.

Laboratory Practical

Lab practical involves things like identifying a structure, a type of stain through a microscope, a problem with preparation, reading biochemical test results and answering safety questions. These simulations allow students to attempt the experiments in the laboratory in a risk-free way that provides the opportunity to make mistakes and learn how to correct them using the immediate feedback generated.

Significance of its usage

- Enhance mastery of subject matter.
- Develop scientific reasoning.
- Develop practical skills.
- Develop team work abilities.

Demonstration

The demonstration method in teaching can be defined as giving a demo or performing a specific activity or concept. It is a teaching-learning process carried out in a very systematic manner.

Significance of its usage

- Promotes learning and correlates theory with practice.
- Sharpens observation skills.
- Sustain interests in learning environment.
- Helps teacher to evaluate students response

Case Presentation

It is a teaching method which provides descriptive information about a clinical patient scenario and to share this educational experience with the general medical and scientific community. It prepares students for clinical practice, using authentic clinical cases by linking theory to practice with the help of inquiry-based learning methods.

Significance of its usage

- Cultivate the capacity for critical analysis.
- Judgment and Decision making
- Facilitate creative problem solving.
- Allow students to develop realistic solutions to complex problems

Assessment Strategies

Assessment tools for Theory

- Multiple Choice Questions (MCQ)
- Structured Essay Questions (SEQ)
- Reflective paper
- Assignment Presentation

Assessment tools for Practical, Clinical and Human (soft) skills

- Objective Structured
- Practical Examination
- Objective Structured Clinical Examination Structured Viva
- Short CaseLong Case
- Logbook Portfolio
- Feedback (simple and/or 360 degree)

BLOCK-4

PERLS

Code	Domain	Attribute	Specific Learning Outcome	Topic	Portfolio Entry
PERLs-2-01	Professionalism	Responsible & Accountable	Develop a dress code for your class	Importance of codes, rules, and regulations in civilized societies Dress codes followed by international medical societies and institutions	Dress Code
PERLs-2-02			Demonstrate punctuality in attending classes	Importance of time	Attendance record
PERLs-2-03		Self-Aware	Demonstrate improvement in one area of weakness identified in the previous year	Setting and tracking milestones in strategic planning	Letter or certificate of accomplishment of a self-reflection
PERLs-2-04		Team Player	Develop a code of conduct for students in the small group discussions in teams	Group discussion Techniques of focus group discussion Democratic vs consensus-based decision making	Code of Conduct
PERLs-2-05	Ethics	Digital	Upgrade the portfolio with at least two and personal achievements in last one year	e-Portfolio Personal websites	Updated entries

PERLs-2-06		Citizen	Write a blog or a wiki	Different form of digital content Engagement strategies with digital content Structure of a wiki	Published wiki or blog
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				and blogpost	
PERLs-2-07	Research	Evidence Based Practitioner	Identify a topic for literature review	What is research What is the scientific method Developing a Literature search strategy	Research topic finalization process record
PERLs-2-08	Leadership	Resilient & Adaptable	Write a report on different coping mechanisms used by you during year 1	Comparison between coping strategies Choosing the right coping strategy for academic and personal issues Report writing	Report

READING RESOURCES

Anatomy

- Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams, and Wilkins:
- The Developing Human by K.L. Moore.
- Snell's Clinical Neuroanatomy.
- Laiq H.S. Medical Histology. Paramount Books.

Physiology

- Guyton AC and Hall JE. Textbook of Medical Physiology. W. B. Saunders & Co., Philadelphia.

Biochemistry

- Champe, P.C. & Harvey, E.A. Biochemistry (Lippincott's Illustrated
- Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell. Harper's Biochemistry. McGraw-Hill.
- ABC of Clinical genetics by H.M. Kingston.

Pathology

- Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.
- Richard Mitchall, Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pocket Companion to Pathologic basis of diseases. Saunder Harcourt.
- Walter and Israel. General Pathology. Churchill Livingstone.

Pharmacology

- Basic and Clinical Pharmacology by Katzung, Mc Graw-Hill.
- Pharmacology by Champe and Harvey, Lippincott Williams & Wilkins

Behavioral Sciences

- Hand book of Behavioral Sciences by Prof. Mowadat H.Rana, 3rd Edition
- Integrating Behavioral Sciences in Healthcare by Asma Humayun & Michael Herbert.

Community medicine

- Parks Textbook of Preventive and Social Medicine. K.Park (Editor)
- Public Health and Community Medicine Ilyas, Ansari

Islamiyat/Pakistan studies Books

- Standard Islamiyat (Compulsory) for B.A, B.Sc., M.A, M.Sc., MBBS by Prof. M. Sharif Islahillmi Islamiyat (Compulsory) for B.A. B.Sc., & equivalent.
- Pakistan studies (Compulsory) for B.A. B.Sc., B.Com., Medical/Engineering by Prof. Shah Jahan Kahlun
- Pakistan studies (Compulsory) for B.A, B.Sc., B.Com., B.Ed., Medical/Engineering by Prof. Shah Jahan Kahlun