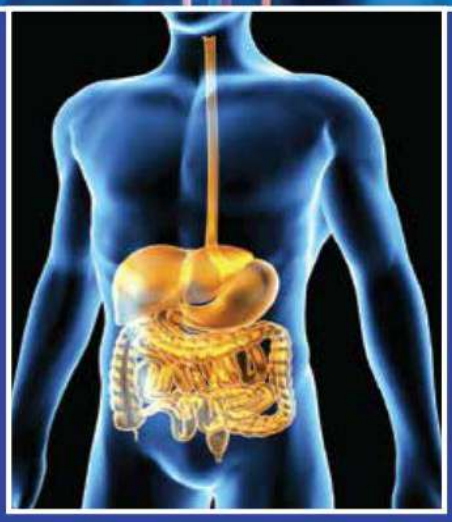
STUDY GUIDE

Block - 4

GIT & NUTRITION - 1 & RENAL - 1 MODULE

2nd Year MBBS



Department of Medical Education
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1. 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
CO2	Carbon dioxide
COPD	Chronic obstructive pulmonary disease
COX	cyclooxygenase
CPR	Cardio pulmonary Resuscitation
CT	Computed tomography
CV	Cardiovascular

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

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

2. Curriculum 2k23 Framework

YEAR	MODULES	
YEAR 1	• Foundation-1 • Hematopoietic & Lymphatic	**Block 1**
	• Musculoskeletal & Locomotion-1	**Block 2**
	• Cardiovascular-1 • Respiratory-1	**Block 3**
	• PERLs 1 • Quran-1 • Islamiyat & Pak Studies	**Will be taught throughout the year**
	• Clinical Skills Foundation C-FRC **1** (Clinical – Foundation, Rotation, Clerkships)	
YEAR 2	• GIT & Nutrition • Renal • Endocrinology & Reproduction • Neurosciences • Head & Neck, Special Senses • Inflammation • PERLs - 2 • Quran-2 • Islamiyat & Pak Studies	
	• Clinical Skills Foundation C-FRC **2** (Clinical – Foundation, Rotation, Clerkships)	
YEAR 3	• Foundation-2 • Infectious Diseases • Neoplasia • Musculoskeletal & Locomotion-2 • Hematopoietic, Immunity & Transplant-2	

	• Cardiovascular-2 • Respiratory-2 • Forensic medicine • Community Medicine & family Health-1 • PERLs - 3 • Quran-3
	• Clinical Rotations C-FRC **3** (Clinical – Foundation, Rotation, Clerkships)
YEAR 4	• Renal-2 • Endocrine & Reproduction-2 • GIT & Nutrition-2 • Neurosciences-2 • Maternal & Child Health • Ophthalmology • Otorhinolaryngology • Community Medicine & family Health-2 • Psychiatry & Behavioral Sciences • PERLs - 4 • Quran-4 • **Electives** • **BLS workshop**
	• Clinical Rotations C-FRC **4** (Clinical – Foundation, Rotation, Clerkships)
YEAR 5 (Clerkships)	• Gynecology & Obstetrics • Pediatrics • Medicine • Surgery **Clinical Clerkships** C-FRC **5** (Clinical – Foundation, Rotation, Clerkships)

3. Introduction to Study Guide

The study guide serves several crucial purposes:

1. **Communicating information on the organization and management of the module:**

   This aids students in identifying the appropriate point of contact in case they encounter any difficulties during the semester.

2. **Defining the objectives expected to be achieved by the end of the module:**

   It outlines clear learning goals, ensuring that students understand what is expected of them academically.

3. **Identifying the learning strategies employed to achieve module objectives:**

   These strategies may encompass various methods such as lectures, small group sessions, clinical skills practice, demonstrations, tutorials, and case-based learning.

4. **Providing a list of learning resources:**

   Students are offered a comprehensive list of resources, including books, computer-assisted learning programs, web links, and journals. These resources empower students to maximize their learning potential.

5. **Highlighting information on the contribution of continuous assessment and semester examinations:**

   This section emphasizes the significance of ongoing assessments and final exams in determining a student's overall performance in the module.

6. **Including information on assessment methods:**

   Details about the various assessment methods employed to evaluate students' progress in achieving the objectives are outlined.

7. **Focusing on examination policies, rules, and regulations:**

This section clarifies the policies and regulations governing examinations, ensuring that students are well-informed about the rules they must adhere to during their assessments.

By providing students with this comprehensive guide, educational institutions aim to enhance their learning experience, facilitate effective academic management, and foster compliance with academic standards and regulations.

4. Block–4 Module Committee

BASIC HEALTH SCIENCES	CLINICAL SCIENCES
Anatomy: Prof. Dr. Quddus Ur Rehman	**Medicine:** Prof. Dr. Ghulam Abbas Sheikh
Physiology: Prof. Dr. Farah Amir Ali	**Surgery:** Prof. Dr. Sarwat Saqib
Biochemistry: Prof. Dr. Shakeel Ahmad Dr. Saira Saad	**Radiology:** Prof. Dr. Fatima Imran
Community Medicine: Prof. Dr. Humayun Suqrat	**Gynecology:** :Prof. Dr. Nazia Mussarat
Pathology: Prof. Dr. Kashif Baig	
Pharmacology: Dr. Sarwat Jahan	
Behavioral Sciences: Dr. Subhan Ansari	
Medical Education: Dr. Ayesha Sadiq	

Block Coordinator	**Dr. Benash Altaf**

Principal AFMDC	**Prof. Dr. Muhammad Saeed**

GIT AND NUTRITION-1 MODULE

5. Introduction of GIT and Nutrition-1 Module

Welcome to the Gastrointestinal Tract (GIT) and Nutrition module, an essential component of your second-year MBBS curriculum. This module is designed to provide you with a comprehensive understanding of the structure, function, and disorders of the gastrointestinal system, as well as the fundamental principles of nutrition and their clinical implications.

The gastrointestinal tract, often referred to as the digestive system, plays a crucial role in the breakdown and absorption of nutrients essential for maintaining health and sustaining life. Through a series of intricate processes, beginning with ingestion and culminating in excretion, the GIT facilitates the digestion of food, absorption of nutrients, and elimination of waste products.

Throughout this module, you will delve into the anatomy and physiology of the GIT, exploring its various components such as the mouth, esophagus, stomach, small intestine, large intestine, and associated accessory organs including the liver, gallbladder, and pancreas. You will learn about the mechanisms underlying digestion, absorption, and motility, gaining insight into how the intricate interplay of physiological processes ensures efficient nutrient uptake and waste elimination.

In addition to understanding the normal functioning of the GIT, this module will also focus on the pathophysiology of gastrointestinal disorders.

Moreover, this module will emphasize the crucial role of nutrition in maintaining health and preventing disease. You will explore the principles of nutritional science, including macronutrients, micronutrients, dietary guidelines, and the impact of nutrition on overall health and well-being. Understanding the relationship between diet and disease will enable you to counsel patients on dietary modifications and lifestyle interventions to optimize health outcomes.

As future healthcare professionals, proficiency in understanding and managing gastrointestinal and nutritional disorders is paramount to your ability to provide comprehensive patient care. By mastering the content of this module, you will lay the foundation for your clinical practice and develop the skills necessary to address the diverse needs of patients with gastrointestinal and nutritional concerns.

We encourage you to approach this module with enthusiasm and dedication, as the knowledge and skills you acquire will not only enhance your academic prowess but also empower you to make a meaningful difference in the lives of your future patients.

5.1. 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.

5.2. Module Outcomes

- To describe gross and microscopic anatomy of different parts of gastrointestinal system andassociated organs
- To describe the embryological development of different parts of gastrointestinal system andassociated organs
- To describe the functional anatomy and physiology of different parts of gastrointestinal systemand associated organs
- To describe the motility, secretary 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

5.3. Learning Objectives

5.3.1. Knowledge

- **Anatomy**

Topic	Sub Topic	Learning objectives
Gross Anatomy	Oral Cavity and Oropharynx	• Describe the gross anatomical features of oral cavity with its neurovascular supply and lymphatic drainage • Discuss the location, anatomical features, relations and vascular supply of tonsils: nasopharyngeal, palatine and lingual. • Discuss the skeletal framework of hard palate with its neurovascular supply and lymphatic drainage • Describe the gross anatomical features of soft palate with its neurovascular supply and lymphatic drainage • Describe the attachments, nerve supply and actions of muscles of soft palate • Describe the structure of tongue with attachments of muscles, blood supply, nerve supply and lymphatic drainage • Discuss the anatomical basis of injury to hypoglossal nerve • Describe anatomical features, relations and neurovascular supply of parotid gland and its duct, mentioning the structures entering and exiting the gland. • Discuss the clinical correlates of parotid gland: parotiditis, Mumps, Frey's syndrome, parotid duct injury and parotid tumor surgery with its complications. • Describe the Waldeyer's ring. • Describe anatomical features, relations and neurovascular supply of submandibular and sublingual glands with their ducts. • Name the parts of pharynx giving their extent, anatomical features, structure, neurovascular supply and Lymphatic drainage • Name the pharyngeal constrictor muscles defining their attachments, innervation and structure traversing the gaps between adjacent

		muscles.
	Anterior Abdomen Wall	• Describe the planes and quadrants of abdomen • 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 • Describe anterolateral Abdominal wall arteries, Veins and Lymphatic and related clinicalcorrelates—Caput Medusae • Describe the attachments, nerve supply and actions of muscles of anterior abdominal wall • Identify the muscles of anterolateral abdominal wall on anatomical model and/or cadaver • Describe the extent, formation and contents of rectus sheath • Give the formation and extent of inguinal ligament • 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 • 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 • Describe the location of abdominal surgical incisions • Mark the abdominal incisions on simulated patient/subject and explain their anatomical basis • List the structures and coverings of spermatic cord
		• Trace the horizontal and vertical peritoneal reflections • Describe the relationship of viscera to the

	Peritoneum	peritoneum • Describe the gross anatomical features of the following: Mesentery Omentum Peritoneal ligaments Peritoneal fold Peritoneal sac, Recesses, Spaces and Gutters • Describe the nerve supply of Peritoneum • Describe the anatomical basis and manifestations of the following: Peritonitis and ascites Peritoneal adhesions (and adhesiostomy) Abdominal paracentesis
	Esophagus	• 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)
	Stomach	• 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 • 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
	Small & Large Intestine	• Describe the location, position, parts, relations, neurovascular supply and lymphatic drainage of duodenum • Describe the anatomical basis and manifestations of the following conditions: Duodenal Ulcers Ileal diverticulum Diverticulosis Large bowel cancer

		Appendicitis Volvulus Intussusception • Demonstrate the various positions of appendix • Identify and demonstrate the Parts and external features of small and large intestines on anatomical model and cadaver
	Liver	• Describe the origin, course, branches (tributaries in case of veins) and distribution of the blood vessels of GIT • 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 • Describe location, lobes, important relations, peritoneal ligaments, blood supply lymphatic drainage, nerve supply, related clinical correlates of liver and sub phrenic spaces.
	Biliary System	• Describe components of Biliary tree- hepatic duct and bile duct • Describe relations, functions, blood supply, lymphatic drainage and nerve supply of Gallbladder • Describe related clinical correlates- gall stones, biliary colic, cholecystectomy, gallbladder gangrene
	Pancreas	• Describe the location, surfaces, peritoneal reflections, relations, neurovascular supply and lymphatic drainage of pancreas • Describe the anatomical basis and manifestations of pancreatitis and pancreatic cancer • Identify the parts of the pancreas
	Spleen	• Describe the location, surfaces, peritoneal reflections, relations, neurovascular supply and lymphatic drainage of spleen • Describe the anatomical basis and manifestations of splenic trauma and splenomegaly

		• Identify the borders, surfaces and Impressions of spleen • Demonstrate the correct anatomical positioning of spleen.
	Sigmoid Colon, Rectum & Anal Canal	• Describe the gross anatomical features, peritoneal relations, blood supply, nerve supply and lymphatic drainage of sigmoid colon, rectum and anal canal. • Describe the anatomical basis for Sigmoidoscopy, rectal prolapse, rectal examination, rectal cancer and hemorrhoids
	Surgical Intervention	• Outline the anatomical basis and surgical treatment plan for the following diseases: Esophageal Injuries Gastric Carcinoma Intestinal Obstruction Pancreatic Carcinoma Obstructive Jaundice Gall Stones
Embryology & Post-Natal Development	Oral Cavity	• Describe the development of tongue • Describe the embryological basis of tongue tie • Describe the development of palate • Describe the embryological basis of various facial clefts • Identify the parts of the developing tongue and palate
	Foregut	• Describe the formation and divisions of gut tube • Describe the development of mesenteries • Describe the development of esophagus • Describe the embryological basis of esophageal atresia and/or tracheoesophageal fistula • Describe the development and rotation of stomach • Describe the embryological basis of pyloric stenosis • Describe the development of duodenum, liver and gall bladder • Describe the embryological basis of intrahepatic and extrahepatic biliary atresia • Describe the development of pancreas • Describe the embryological basis of annular pancreas

	Midgut	• Describe the embryological basis of the following mobile cecum volvulus retro colic hernia Omphalocele gastroschisis
	Hindgut	• Describe the embryological basis of Meckel's diverticulum • Describe the embryological basis of; Gut rotation defects Gut atresia and stenosis • Describe the development of hindgut • Describe the embryological basis of; Rectourethral and rectovaginal fistulas Recto anal fistulas and atresia Imperforate anus Congenital megacolon • Identify the parts of the developing foregut, midgut and hindgut originating from the endoderm
Microscopic Anatomy (Histology & Pathology)	Oral Cavity & Esophagus	• Describe the light microscopic structure of; Lips Tongue including lingual papillae and taste buds 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 • Relate the characteristics of various layers of GIT with their function • Describe the light microscopic structure of esophagus • Tabulate the histological differences between different parts of esophagus • Describe the histological changes associated with reflux esophagitis and Barrett's

		esophagus
	Stomach	• Describe the light microscopic structure of stomach • Describe the role of parietal cells in pernicious anemia
	Small Intestine	• Describe the light microscopic structure of Duodenum Jejunum Ileum • Discuss the histological basis of celiac disease • Discuss the histological basis of Crohn's disease
	Large Intestine	• Describe the light microscopic structure of Colon Appendix Rectum • Define colorectal cancer, anal abscess, hemorrhoids

➢ Physiology

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

		respiration • Discuss the mechanism of oesophagal stage of swallowing • Enlist causes of dysphagia • Explain the types and roles of different peristalsis originating in the esophagus • Discuss the role of Lower Esophageal Sphincter (Gastroesophageal) • Discuss the pathophysiology of achalasia & Megaesophagus • Enlist the features and treatment of achalasia
	Stomach	• Explain storage function of stomach • Describe the basic electrical rhythm of stomach wall • Explain the role of pyloric pump and pyloric sphincter in gastric emptying • Explain the factors that promote Stomach Emptying • Discuss the duodenal (nervous & hormonal) factors that inhibit Stomach emptying • Enlist the factors that initiate enterogastric inhibitory reflexes • Enumerate the causes, features, and pathophysiology of gastritis • Explain the physiological basis of each feature of gastritis • Recommend treatment of gastritis • Enumerate the causes, features, and pathophysiology of peptic ulcer • Explain the physiological basis of each feature of peptic ulcer
	Small Intestine	• Enumerate and explain the hormones and movements of small intestine • Explain the term “peristaltic rush” • Explain the functions of ileocecal valve and sphincter • Enumerate the types of intestinal sprue • Enlist the features of intestinal sprue • Explain the consequences of sprue on the body
	Large Intestine	• Enumerate the types of movements taking place in colon • Explain the mechanism of developing movements of colon and their control through Gastrocolic and Duodenocolic Reflexes

		• Enlist the defecation reflexes • Explain the mechanism of defecation reflex • Trace the reflex arc of defecation • Name the other autonomic reflexes that affect bowel activity • Explain the pathophysiology of constipation • Discuss the causes of diarrhea • Describe the cause of Hirschsprung's disease integrate with Medicine
	Liver	• Explain the functions of liver • Differentiate between liver and gall bladder bile and the hormones acting on them • Enumerate the causes and composition of developing gall stones
	Pancreas	• Explain function and secretions of pancreas • Enlist the causes and pathophysiology of acute and chronic pancreatitis • Enumerate the features of acute pancreatitis and explain the physiological basis of each feature of pancreatitis
	Vomiting Reflex	• Describe the stages of vomiting act • Trace the reflex arc of vomiting • Explain the role of chemoreceptor trigger zone for initiation of vomiting by drugs or by motion sickness
	Malnutrition	• Define Malnutrition • Identify various causes of malnutrition • Identify the risk factors of malnutrition • Outline treatment strategies
	Acute & Chronic Diarrhea	• Define Acute Diarrhea • Define Chronic Diarrhea • Enlist various causes for acute and chronic diarrhea

➢ Medical Biochemistry

Topic	Sub Topic	Learning objectives
Medical Biochemistry	Biochemistry of GIT /GIT secretions & digestion and absorption of dietary carbohydrates	• Give the composition and importance of saliva and related clinical disorder (xerostomia) • Give the composition and importance of gastric juice with special reference to mechanism of HCl secretion and related clinical disorders (achlorhydria, gastric ulcer • Give the composition and importance of pancreatic juice, bile and succus entericus and related clinical disorders (pancreatitis, cystic fibrosis, cholelithiasis). • Describe digestion and absorption of dietary carbohydrates along with inherited and acquired disorders (lactose intolerance, sucrase-isomaltase deficiency).
	Carbohydrate metabolism/ Entry of glucose into cells	• Elaborate key features of various transport systems for entry of glucose into cells.
	Carbohydrate metabolism/ Hormonal control of BSL	• Enlist the hormones that play important roles in regulating carbohydrate metabolism. • Elaborate the metabolic effects of these hormones. • Infer the consequences of deficiency and excess of these hormones
	Carbohydrate metabolism/ Glycolysis	• Describe the glycolytic pathway along with its regulation and significance. • Compare key features of aerobic and anaerobic glycolysis. • Calculate the number of ATP produced during aerobic and anaerobic glycolysis. • Explain hemolytic anemia in subjects with pyruvate kinase deficiency based on your biochemical knowledge. • Clearlydifferentiate between substrate level Phosphorylation and oxidative phosphorylation.
	Carbohydrate metabolism/ Metabolic fates of pyruvate	• Discuss the metabolic fates of pyruvate. • Describe the transport of pyruvate from cytosol to mitochondria. • 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.
	Carbohydrate metabolism/ Kreb's Cycle	• Describe the TCA cycle along with regulation & significance. Calculate the energy yield of TCA
	Carbohydrate metabolism/ Gluconeogenesis	• Define gluconeogenesis and enumerate gluconeogenic substrates (precursors) • Delineate the reactions involved in synthesis of glucose from various gluconeogenic substrates. • Elaborate the regulation and importance of gluconeogenesis. • Explain the significance of Cori cycle and glucosealanine cycle
	Carbohydrate metabolism/ Glycogen metabolism	• Illustrate the reactions of glycogenesis, glycogenolysis along with their regulation and significance • Enlist various types of glycogen storage diseases (GSDs) • Infer the key biochemical and clinical features of various GSDs from the respective enzyme deficiencies.
	Carbohydrate metabolism/ HMP Hexose Monophosphate Pathway	• Describe the reactions and regulation of Hexose Mono Phosphate Pathway (HMP). • Discuss the importance of HMP shunt • Explain hemolytic anemia in subjects suffering from G6PD deficiency. • Diagnose G6PD (glucose-6-phosphate dehydrogenase) deficiency based on given data.
	Carbohydrate metabolism/ Uronic acid pathway & sorbitol pathway	• Describe the reactions, regulation, and biomedical importance of uronic acid pathway and sorbitol pathway
	Carbohydrate metabolism/ Metabolism of galactose & fructose	• Outline the reactions involved in metabolism of galactose and fructose. • Infer the key biochemical and clinical features of galactosemia, essential fructosuria, and hereditary fructose intolerance (HFI) from the respective enzyme deficiencies. • Explain hypertriacylglycerolemia, hypercholesterolemia, and hyperuricemia associated with fructose loading of liver.

	Carbohydrate metabolism/ Ethanol metabolism	• Outline the reactions involved in ethanol metabolism. • Explain how ethanol consumption causes hypoglycemia and fatty liver.
	Respiratory chain & oxidative phosphorylation /ETC	• Diagrammatically illustrate the organization of electron transport chain (ETC) depicting the flow of electrons • Enlist the components of complex I, II, III, and IV • Enumerate clinically important inhibitors of electron transport chain and mention their site of action.
	Respiratory chain & oxidative phosphorylation /ATP synthesis	• Elaborate the structure of ATP synthase (complex V). • 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) • Elaborate the effect of oligomycin and uncouplers on ATP production. • Describe the effect of arsenic poisoning on carbohydrate metabolism and ATP production. • Elaborate the glycerol 3-P shuttle and malate-aspartate shuttle for the transfer of reducing equivalents from cytosol into the mitochondria.
	Nutrition/ Balanced diet	• Define and classify nutrients into macro and micronutrients. • Elaborate the concept and importance of Balanced Diet • Enlist the components of balanced diet and elaborate the importance of each component.
	Nutrition/ Special nutritional requirements	• Delineate special nutritional requirements during pregnancy, lactation, growth, and old age. • Suggest dietary advice for patients suffering from diabetes mellitus, hypertension, obesity, renal disease, lactose intolerance, gluten enteropathy, hypercholesterolemia, and hemorrhoids.
	Nutrition/ PEM	• Enlist causes and types of Protein Energy Malnutrition (PEM). • Differentiate between Kwashiorkor and

		Marasmus based on the given data • Enlist symptoms and signs • Outline treatment strategies
	Nutrition/ Caloric requirements	• Define energy balance. • Compare the energy content of macro nutrients and alcohol. • Suggest a simple method for estimation of caloric requirements of sedentary adults, moderately active adults, and very active adults
	Nutrition/ BMR	• Define basal metabolic rate (BMR) • Elaborate the effect of various physiological and pathological factors on BMR.
	Nutrition/ BMI & Obesity	• Define body mass index (BMI). • Categorize individuals into underweight, normal, overweight, obese, and morbidly obese based on theirs BMI values. • Elaborate the role of genetic, environmental, and behavioral factors in determining body weight. • Clearly differentiate between upper body obesity and lower body obesity. • Enlist health risks associated with obesity.
	Vitamins/ Energy releasing vitamins & vitamin E and K	• Describe sources, Recommended Dietary Allowance (RDA), biochemical functions, deficiency, and toxicity of vitamin B1, B2, B3, B5 and B7. • Describe sources, RDA, biochemical functions, deficiency, and toxicity of vitamin E and vitamin K.
	Minerals	• Define and classify minerals according to their daily requirements. • Give sources, functions and biomedical importance of Na, K and Cl. • Describe sources, functions and biomedical importance of Mg, Se, I, F, Cu, Cr, Mn, Mo, Zn and Co.
	Malnutrition	• Define Marasmus and Kwashiorkor
	Acute & Chronic Hepatitis	• Define Acute Hepatitis • Define Chronic Hepatitis • Enlist various causes for acute and chronic hepatitis • Describe various symptoms and signs of chronic hepatitis • Outline treatment strategies

- **Aging**

Topic	Sub Topic	Learning objectives
Aging	Preventive Medicine in Geriatrics	• Identify causes and risk factors for malnutrition in elderly • Outline treatment strategies

- **Pathophysiology and Pharmacotherapeutics**

Topic	Sub Topic	Learning objectives
Pharmaco-therapeutics	Anti-Diarrheal Drugs	• Classify anti diarrheal drugs and describe the pharmacokinetics, mechanism of action, pharmacological effects, uses and adverse effects
Pathophysiology	Peptic Ulcer	• Describe the etiology, pathogenesis, morphology and clinical features of peptic ulcer disease
	Infectious agents causing Diarrhea	• Enumerate common infectious agents of diarrheal diseases • Discuss pathogenesis and clinical features of common pathogens

- **Disease Prevention & Impact**

Topic	Sub Topic	Learning objectives
Behavioral Sciences	Health related behaviors	• Identify health related behaviors and apply principles of learning to modify eating and addictive patterns
	Health related believes	• Discuss health belief model and its application in managing common presentations related to gastro-intestinal system • Explain the trans theoretical model of changing behaviors to modify the diseases pattern
	Management of Obesity	• Describe motivational interviewing and outline a management plan to help the

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

5.3.2. Skills

- **Practical**

Topic	Sub Topic	Learning objectives
Histology	Oral Cavity	• Identify, draw and label the histological sections of Tongue and Lips and enumerate points of identification
	Salivary Gland	• Identify, draw and label the histological sections of Salivary glands (Submandibular, Sublingual and Parotid)
	Upper GIT	• 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
	Small Intestine	• Identify, draw and label the histological structure of small intestine (Duodenum, Jejunum, and Ileum) and enumerate points of identification
	Large Intestine	• Identify, draw and label the histological structure of large intestine and enumerate points of identification
	Organs associated with GIT	• Identify, draw and label the histological sections of Gall bladder, liver and enumerate points of identification
	Organs associated with GIT	• Identify, draw and label the histological sections of pancreas and enumerate points of identification
	Lymphatic tissue associated with GIT	• Identify, draw and label the histological sections of Palatine tonsil, appendix, peyer's patches and enumerate points of identification
Biochemistry	Estimations of blood/urine analytes	• Estimate blood glucose level by glucose oxidase method and interpret the results • Determine blood glucose level by glucometer and interpret the result. • Perform Glucose tolerance test (GTT) and interpret the results. • Determine urine glucose by dipstick method and interpret the result. • Estimate serum amylase and interpret the result.

	Interpretation of results	• Interpret the results of Lactose tolerance test.
	Determination & interpretation of results	• Determine BMI of given subject and interpret the results.
	Cranial nerve	• Demonstrate Cranial nerve V, IX & X testing

5.3.3. C-FRC for GIT and Nutrition-1 Module

GIT AND NUTRITION-1 MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Demonstrate steps of abdominal examination	Abdominal Examination	Shows
Demonstrate the procedure of shifting dullness	shifting dullness	Shows
Identify organs on X-ray abdomen	X-ray Abdomen	Shows
Assess dehydration in infant/young child and explain procedure of making home made ORS	Dehydration	Does

RENAL-1 MODULE

6. Introduction of Renal-1 Module

Welcome to the renal module, an essential component of your second-year MBBS curriculum. This module aims to provide you with a thorough understanding of the renal system, its anatomy, functions, and disorders. The renal system, comprising the kidneys and urinary tract, is crucial for maintaining bodily homeostasis and eliminating waste products.

Throughout this module, we will explore the intricate structures and functions of the kidneys, delving into both microscopic and macroscopic aspects. You will gain insights into renal physiology, including filtration, reabsorption, and secretion processes, which are pivotal in urine formation and electrolyte balance regulation.

Moreover, this module will address the pathophysiology of renal disorders, ranging from common conditions like urinary tract infections and kidney stones to more complex ailments such as acute kidney injury and chronic kidney disease. Recognizing and managing these conditions are fundamental skills for any medical practitioner.

We will also emphasize the systemic importance of renal function, understanding its interplay with other organ systems and its implications for overall health. Through this interdisciplinary approach, you will be equipped to provide comprehensive care to patients with renal disorders.

Approach this module with enthusiasm and dedication, as mastering the concepts presented here will lay a solid foundation for your clinical practice. Let us embark on this journey together, exploring the fascinating world of renal medicine and its profound impact on patient care.

6.1. 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:

6.2. Module Outcomes

- 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.

6.3. Learning Objectives

6.3.1. Knowledge

- **Thorax**

Topic	Sub Topic	Learning objectives
Gross Anatomy	Kidney	• Describe gross features and facial coverings of kidneys. • Compare and contrast the relations of right and left kidneys. • Describe blood supply, lymphatics and nerve supply of kidney • Discuss the clinical aspects of kidneys • Demonstrate the surface marking and radiographic anatomy of kidney. • Identify the side of kidney
	Ureter	• Compare and contrast the relations of right and left ureter • Give the constrictions of ureter Describe the blood supply nerve supply and lymphatics of ureter • Identify the ureter.
	Urinary bladder	• Describe the gross anatomical features, relations, surfaces, blood supply, nerve supply and lymphatics of urinary bladder • Give the clinical corelates of urinary bladder • Identify the gross features and surfaces of urinary bladder
	Sign/symptom/investigations	• Interpret basic urological signs/symptoms & investigations.
	Urinary retention	• Describe the etiology, and management of urinary retention.

	Radiograph	• Identify and describe the various anatomic landmarks of the renal system on radiographs.
	Urethra	• Describe the parts of urethra.
Embryology & Post-Natal Development	Development of a urinary system	• Describe the development of intermediate mesoderm and its derivatives • Describe the development of pronephros, mesonephros and metanephros • Describe positional changes during descent of kidney with correlation to its blood supply • Describe the development of urinary bladder and urethra • List and describe the common congenital anomalies of kidney, urinary bladder and urethra.
Microscopic Structure Histology	Structure of kidney	• Describe the histological, structural organization and functions of kidney with clinicals.
	Juxtaglomerular apparatus	• Describe the light and ultrastructure of the Juxtaglomerular apparatus and glomerular filtration barrier.
	Structure of ureter	• Describe the histological structure of ureter
	Structure of urinary bladder	• Describe the histological structure of urinary bladder • Discuss clinical correlates (Cystitis, Urinary bladder cancer, Urinary Tract Infections (UTIs).

➢ Physiology

Topic	Sub Topic	Learning objectives
Medical Physiology	Body fluid compartment	• Describe major composition of intracellular and extracellular fluids • Define Hypo and hypernatremia • Explain the causes of hypo & hypernatremia and their effects on Composition of body fluid compartments • Describe difference between iso-osmotic, hyperosmotic, hypo-osmotic fluids
	Edema	• Enumerate causes of Intracellular and extracellular edema • Describe safety factors that prevent edema
	Function	• Explain the functions of the kidney
	Micturition reflex	• Describe the mechanism of micturition and its control • Explain the role of higher center on micturition • Explain the physiological anatomy and innervation of bladder • Discuss the voluntary control of micturition
	Abnormalities of micturition	• 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
	Urine formation	• Enlist the steps of urine formation. • Explain the physiological anatomy and functions of glomerular capillary membrane • Discuss the composition of filtrate • Explain the minimal change nephropathy and increase permeability to plasma protein

	Glomerular filtration	• Define Glomerular Filtration Rate (GFR). • Describe the determinants of GFR • Explain the factors affecting GFR Discuss the hormones and autocoids that affect GFR • Explain mechanisms of autoregulation of GFR • Enlist the physiological and pathological factors that decrease GFR • Explain the effects of angiotensin II blocker on GFR during renal hypoperfusion
	Reabsorption	• Enumerate different types of transport along the kidney tubules for reabsorption • Explain the reabsorption and secretion along different parts of the Nephron • Explain the regulation of tubular reabsorption • Discuss the forces/pressure and hormones that • Determine renal tubular reabsorption • Explain the reabsorption of water along different parts of nephron • Define obligatory and facultative reabsorption • Discuss the characteristics of late distal tubules and cortical collecting ducts • Discuss the characteristics of medullary collecting ducts
	Clearance method	• Explain the use of clearance method to quantify kidney function
	Transport maximum	• Describe mechanism of re-absorption of sodium along different parts nephrons • Define and explain the term Transport maximum for the substances • Define filtered load for the substance • Justify the difference of transport maximum and renal threshold of glucose in

		renal tubules
	Urine concentration and dilution	• Explain the renal mechanisms for excreting Dilute urine • Explain the mechanism for forming a concentrated urine • Discuss the role of urea in the process of counter current multiplier mechanism • Describe the countercurrent exchange in vasa Recta to preserve hyperosmolarity of renal medulla
	Obligatory urine volume	• Define and explain the term obligatory urine volume. • Define and explain free water clearance. • Define Urine specific gravity.
	Disorders of urine concentrating ability	• Enumerate different abnormalities of urinary concentrating ability
	Diabetes insipidus	• Enumerate the types of Diabetes insipidus • Enlist the features of diabetes insipidus • Explain the pathophysiology and treatment of central diabetes insipidus • Discuss the pathophysiology of nephrogenic diabetes insipidus
	Osmoreceptor ADH Feedback System	• Make the flow chart to show the Osmoreceptorantidiuretic hormone (ADH) feedback mechanism for regulating extracellular fluid osmolarity in response to a water deficit. • Enlist the factors which increase and decrease the release of ADH
	Thirst	• Explain the mechanism of thirst
	Renal regulation of potassium	• Enumerate the factors that can alter potassium distribution between intracellular and extracellular fluids • Discuss the process of secretion of potassium by renal tubules Explain the regulation of internal potassium distribution and potassium secretion

	Control of ECF osmolarity	• Explain the control of extracellular fluid osmolarity and sodium concentration
	Control of ECF	• Explain the integration of renal mechanism for control of Extracellular Fluid (ECF) • Explain the importance of pressure natriuresis and diuresis in maintaining body sodium and fluid balance
	Renal regulation of calcium	• Explain the renal handling of calcium concentration to regulate plasma calcium concentration • Renal regulation of phosphate • Enumerate the factors that alter renal calcium • Enlist the factors that alter renal phosphate excretion
	Renal body fluid feedback control	• Explain the nervous and hormonal factors that increase the effectiveness of renal body fluid feedback control
	ECF and Blood Volume	• Explain the conditions that cause large increase in blood volume and ECF volume • Explain the conditions that cause large increase ECF volume but with normal blood volume
	Acid base balance	• Explain the renal handling of H+ ion.
	Acid base disturbance	• Analyze the acid base disturbances on the basis of pH, HCO3 and CO2 • Explain the causes and compensation of metabolic acidosis • Explain the causes and compensation of metabolic alkalosis • Explain the causes and compensation of respiratory acidosis • Explain the causes and compensation of respiratory alkalosis • Explain the causes and compensation of mixed acid base disorder

	Anion gap	• Define and explain anion gap

➢ **Medical Biochemistry**

Topic	Sub Topic	Learning objectives
Medical Biochemistry	Protein digestion and absorption, reabsorption, and related disorders	• 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)
	Protein Metabolism/ Protein degradation and turnover	• Clearly differentiate between protein digestion and Protein degradation. • 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.
	Protein Metabolism/ Amino acid pool and nitrogen balance	• Define amino acid pool. • Delineate the sources and fates of amino acids. • Define nitrogen balance and its three states. • Give physiological and/or pathological conditions associated with each state of nitrogen balance.
	Protein Metabolism/ Introduction to Reactions involved in catabolism	• Enlist 7 important reactions involved in amino acid metabolism and give a brief introduction of each. (Deamination, Transamination, Trans-deamination, Deamidation, Decarboxylation, Transmethylation & Transpeptidation)

	Protein Metabolism/ Transamination	• 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
	Protein Metabolism/ Trans deamination	• Define oxidative deamination. Describe the reaction catalyzed by glutamate dehydrogenase (GDH) along with its significance. • Define trans deamination
	Protein Metabolism/ Deamidation	• 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.
	Protein Metabolism/ Decarboxylation	• Define decarboxylation. Describe important decarboxylation reactions along with their significance
	Protein Metabolism/ Sources and transport of ammonia	• 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
	Protein Metabolism/ Urea cycle, ammonia intoxication and its management	• 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

	Protein Metabolism/ Biosynthesis of NEAA	• Trace the pathways for synthesis of non-essential amino acids (NEAA) (alanine, aspartate, glutamate glutamine, asparagine, proline, serine, glycine, cysteine, and tyrosine
	Protein Metabolism/ Degradation of carbon skeleton of amino acids	• 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.
	Protein Metabolism/ Inborn errors of amino acid metabolism	• Describe the metabolism of methionine. Discuss cause, Key diagnostics features and management of homocystinuria. • Describe the catabolism of branched chain amino acids. • Discuss cause, key diagnostic features, and management of Maple Syrup Urine disease • Describe the metabolism of tyrosine. • Discuss the cause, key diagnostic features, and management of alkaptonuria, albinism, and type 1 tyrosinemia. • Give cause, key diagnostic features, and management of phenylketonuria (PKU) • Elaborate special roles of glycine, tryptophan, phenylalanine, tyrosine, and methionine.

	Water, pH, Buffers/ Ionization of water	• Describe ionization of water and elaborate its significance. Discuss water and electrolyte balance in health and disease
	Water, pH, Buffers/ pH and pH scale	• Define pH and describe the concept of pH scale.
	Water, pH, Buffers/ weak acids and their significance	• Define weak acids and conjugate base.
	Water, pH, Buffers/ Ka And pKa	• Define Ka and pKa and give their significance
	Water, pH, Buffers/ HH equation and its applications	• Describe Henderson-Hasselbach (HH) equation. (no derivation required) along with its application/use.
	Water, pH, Buffers/ HH equation and its applications	• 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
	Acid Base balance and imbalance/ Renal mechanisms for pH regulation	• Elaborate the role of kidneys in the regulation of acid base balance.
	Acid Base balance and imbalance/ Defense mechanisms against changes in H+ concentration	• Elaborate the concept of 1st, 2nd and 3rd line of defense against changes in H+ ion concentration.
	Acid Base balance imbalance/ Types of acid base disorders	• 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.
	Acid Base balance imbalance/ Tetany in alkalosis	• 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

➢ Pathophysiology and Pharmacotherapeutics

Topic	Sub Topic	Learning objectives
Pharmacology & Therapeutics	Diuretics	• Classify diuretics & carbonic anhydrase inhibitor. MOA, clinical uses, and adverse effects • Describe Thiazide & loop diuretics their Mechanism of Action, clinical uses, and adverse effects. • Describe Potassium sparing and osmotic diuretics their mechanism of action, clinical uses, and adverse effects.
Pathology	Renal Stones	• Discuss the etiology and pathogenesis of different types of stones
	Hydronephrosis	• Identify the causes, morphological aspect & outcome of hydronephrosis
	UTI causative agents	• Enlist common causative agents of urinary tract infections and describe pathogenesis and clinical features of common causative agents of UTI.
	Glomerulonephritis	• Define various presentations of glomerulonephritis. • Define nephrotic and nephritic syndrome. • List various risk factors and outline management of glomerulonephritis.

	Acute Kidney Injury	• Define AKI (acute kidney injury) Identify various risk factors and causes for AKI. Outline management strategies.
	Urinary tract infection	• Define UTI (Urinary Tract Infection) • Identify various risk factors and causes of UTI. • Describe signs and symptoms of UTI. • Outline management strategies.

➢ Aging

Topic	Sub Topic	Learning objectives
Aging	Disease prevention	• To define preventive care in diseases related to urinary system (adults). • Primary, secondary, and tertiary prevention.
	Urinary incontinence	• Define urinary incontinence. • Outline management strategies.

➢ Disease Prevention & impact

Topic	Sub Topic	Learning objectives
Community Medicine and Public Health	Quality of life	• 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
Behavioral Sciences	Dementia, uremic encephalopathy, delusion, muscle paralysis & Societal impact	• To identify the behavioral abnormalities caused by renal function. • To identify the cognitive abnormality. • To identify the dangers for the patient, his family, and society.

6.3.2. Skills

- **Practical's**

Topic	Sub Topic	Learning objectives
Histology	Kidney	• Identify and draw and label the histological structure of kidney and enumerate points of identification
	Ureter	• Identify, draw and label the histological structure of ureter and enumerate its points of identification
	Urinary bladder	• Identify, draw and label the histological structure of urinary bladder and enumerate its points of identification
Biochemistry	Interpretation of results	• Estimate blood urea level and interpret your results. • 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.
Physiology	Interpretation of report	• Perform a complete examination of the urine sample URS-10 (using urine reagent-10) and interpret its report • Determine the specific gravity of urine

6.3.3. C-FRC for Renal-1 Module

RENAL MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Detail the steps of urinary catheterization in females	*Catheterization	Knows how
Detail the steps of urinary catheterization in males	*Catheterization	Knows how

7. Attitude

➢ PERL's for Block-IV

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 Citizen	Upgrade the portfolio with at least two academic and personal achievements in last one year	e-Portfolio Personal websites	Updated entries
PERLs-2-06			Write a blog or a wiki	Different form of digital content Engagement strategies with digital content Structure of a wiki and blogpost	Published wiki or blog
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

ASSESSMENT POLCIY AND TOS OF UHS

8. Teaching & Learning Methodologies

- **Interactive Lectures**

  Interactive lecturing involves an increased interchange between teachers, students and the lecture content. The use of interactive lectures can promote active learning, heighten attention and motivation, give feedback to the teacher and the student, and increase satisfaction for both.

- **Small group discussions**

  Small-group discussion is a student-centered methodology that allows students to actively involve and be partners in the teaching-learning process. Students interact with peers and instructors, discussing, and sharing ideas. They develop the ability to build consensus in a group.

- **Practical's**

  Hands-on performance of skills in laboratory

- **Clinical Skills Session**

- Clinical skills are abilities health care professionals use when assessing, diagnosing and caring for patients. Clinical skills also describe applied medical knowledge, such as assessing bloodwork.

- **Case based Learning**

  Case-based learning is a student-centered learning approach where students read and discuss complex situations and apply their knowledge to each situation. Students typically examine the case together as a team and address the problems within the realistic scenario to develop a reasonable conclusion.

- **Problem Based Learning**

  Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem. This problem is what drives the motivation and the learning.

- **Self-directed learning**

  Self-directed learning is an instructional strategy where the students with guidance from the teacher decide what and how they will learn. It can be done individually or with group, learning, but the overall concept is that students take honor ship of their learning

9. Assessment Methodologies

1. Theory

- **MCQ's**

A multiple-choice question (MCQ) is composed of two parts: a stem that identifies the question or problem, and a set of alternatives or possible answers that contain a key that is the best answer to the question, and a number of distractors that are plausible but incorrect answers to the question.

- **SEQ's**

It is a type of assessment tool in which a question on a topic is given in test or examination requiring a written analysis and explanation usually of a specified length.

2. Practical

- **OSPE**

"Objectively Structured Practical Examination.", as a tool for the assessment of practical skills of undergraduate Medical Students.

- **OSCE**

OSCE stands for "Objectively Structured Clinical Examination." OSCEs are very helpful in medical education because they allow a student to practice and demonstrate clinical skills in a standardized medical scenario.

3. OSVE

OSVE stands for "Objectively Structured Viva Examination". In the viva you have to answer questions and engage with your examiners.

10. Assessment Policy (UHS)

Statutes

1. The first professional MBBS shall be held at the end of first year MBBS whereas, the second Professional MBBS Examination shall be held at the end of the second year.
2. Every candidate shall be required to study contents of Anatomy (including Histology), Physiology, Biochemistry, Behavioral Sciences, Community Medicine & Public Health, Pathology, Pharmacology & Therapeutics, Islamic Studies/Ethics and Pakistan Studies, Clinical skills and Professionalism, Ethics, Research and Leadership. The teaching and assessment shall be done in three modular blocks.
3. There will be three papers in the first professional examination, and four papers in the second professional examination

   First Professional Exam:

   a) Paper 1 will be based on contents of Block 1;
   b) Paper 2 will be based on contents of Block 2;
   c) Paper 3 will be based on contents of Block 3;

   Second Professional Exam:

   a) Paper 1 will be based on contents of Block 4;
   b) Paper 2 will be based on contents of Block 5;
   c) Paper 3 will be based on contents of Block 6;
   d) Paper 4 will be based on contents of Islamic Studies/Civics and Pakistan Studies;

4. Each paper will comprise of two components 'Written' and 'Oral/Practical/Clinical' examinations.
5. The 'Written' and 'Oral/Practical/Clinical' examinations in each paper will carry 150 marks each, making the total marks of 300 for each paper of papers 1, 2 and 3 (inclusive of internal Assessment).
6. Total marks for the First and Second Professional Examination shall be 900, each. Marks of Islamic Studies/Civics and Pakistan Studies shall not be counted towards total marks of any professional examination and determination of positions or merit of the candidate. However, the candidates shall have to take the examination in the subject in their Second Professional MBBS Examination. Those failing the subject in both annual & supplementary examinations, while passing all the other subjects of Second Professional Examination shall be promoted to the 3rd year MBBS, however they will be allowed two more attempts to clear the subject with professional Examination of the next session, failing which they shall be detained in the 3rd Professional MBBS.
7. Major content areas of the first two professional years shall be from:
   a. Anatomy including applied/clinical/Anatomy
   b. Physiology including applied/clinical/Physiology
   c. Biochemistry including applied/clinical/ Biochemistry
8. The Applied/Clinical content for the Anatomy, Physiology and Biochemistry shall be based on clinical correlations.

9. Integrated clinical content areas for the both years include Behavioral Sciences, Community Medicine & Public Health, Pathology, Pharmacology & Therapeutics, Clinical Foundation- 1& II and PERLs- 1 & II.

10. Written Examination

d. The written component of Papers 1, 2, and 3 will consist of 'One-best-type' Multiple Choice Questions (MCQ) and Structured Essay Questions (SEQ) in a ratio of 70:30 %.
e. Each MCQ will have five options (one best response and four distractors) and will carry one (01) mark.
f. There will be no negative marking.
g. There will be no sections within an SEQ, and it will be a structures question with five (05) marks each.
h. SEQ's will only be based on the major content areas of the year.
i. There will be total of 85 MCQs and 07 SEQs in every written paper in Papers 1, 2 and 3.
j. The duration of each written paper will be 180 minutes (03 hours).
k. The MCQ section will be 110 minutes duration and the SEQ section 70 minutes.

11. Oral/Practical/Clinical Examination

a. The Oral/Practical/Clinical examination of each Papers 1, 2, and 3 will consist of a total of twelve (12) OSPE/OSCE/OSVE stations in each Oral/Practical/Clinical examination.
b. There will be seven (07) Observed OSPE (Objective Structured Practical Examination) stations from major subject areas. Each OSPE station will have the Practical component and an evaluation of the underlying principle relevant to that practical with a component of applied knowledge.
c. There will be two (02) Observed OSCE (Objective Structured Clinical Examination) stations, 01 from C-FRC1 and PERLs-1 in each Oral/Practical/Clinical examination.
d. There will be three (03) Observed Interactive OSVE (Objective structured Viva Examination) from major subject areas. Each OSVE station will have a structured Viva to assess a practical component along evaluation of the underlying principle relevant to that practical with a component of applied/practical knowledge and related clinical application.
e. Each OSPE/OSCE will carry eight (08) marks.
f. Each OSVE station will carry 16 marks
g. The duration of each Oral/Practical/Clinical examination will be 120 minutes (2 hours).
h. Time for each OSPE, OSCE and OSVE station will be eight (08) minutes.

12. Every candidate shall take the examination in the following Blocks (Modules) in First & Second Professional MBBS Examination:

Year 1

i. Block 1 (Foundation-I + Hematopoietic & Lymphatic) Marks 300
ii. Block 2 (Musculoskeletal & Locomotion-1) Marks 300
iii. Block 3 (Cardiovascular-l Respiratory-1) Marks 300

Year 2

a. Block 4 (Gastrointestinal Tract & Nutrition- Renal-1) Marks 300
b. Block 5 (Endocrinology & Reproduction Head & Neck, Special Senses) Marks 300
c. Block 6 (Neurosciences-1+ Inflammation) Marks 300
d. Islamic Studies Civics Pakistan Studies Marks 100

A. Block 1 (Foundation- Hematopoietic and Lymphatic)

The examination in Block 1 shall be as follows:

I. One written paper of 120 marks having two parts
   a. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.
   b. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the time allotted shall be 70 minutes.

II. Oral Practical/Clinical examination shall have 120 marks in total.

III. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 60 marks, e 20% of the total allocated marks (300) for the block The score will be equality distributed to the Written and Oral/Practical Clinical Examinations

B. Block 2 (Musculoskeletal & Locomotion-1)

i. One written paper of 120 marks having two parts
   a. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.
   b. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the time allotted shall be 70 minutes

ii. Oral Practical/Clinical examination shall have 120 marks in total.

iii. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 60 marks, e 20% of the total allocated marks (300) for the block The score will be equality distributed to the Written and Oral/Practical Clinical Examinations

C. Block 3 (Cardiovascular-l + Respiratory-1)

I. One written paper of 120 marks having two parts

a. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.

b. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the time allotted shall be 70 minutes.

II. Oral Practical/Clinical examination shall have 120 marks in total.

III. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 60 marks, e 20% of the total allocated marks (300) for the block the score will be equality distributed to the Written and Oral/Practical Clinical Examinations.

D. Block 4 (Gastrointestinal & Nutrition-1 + Renal-1)

The examination in Block 4 shall be as follows

I. One written paper of 120 marks having two parts

a. Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.

b. Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the time allotted shall be 70 minutes.

II. Oral Practical/Clinical examination shall have 120 marks in total.

III. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 60 marks, e 20% of the total allocated marks (300) for the block the score will be equality distributed to the Written and Oral/Practical Clinical Examinations.

E. Block 5 (Endocrinology & Reproduction-1 + Head & Neck, Special Senses)

The examination in Block 5 shall be as follows

I. One written paper of 120 marks having two parts

- **a.** Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.
- **b.** Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the time allotted shall be 70 minutes.

II. Oral Practical/Clinical examination shall have 120 marks in total.

III. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 60 marks, e 20% of the total allocated marks (300) for the block the score will be equality distributed to the Written and Oral/Practical Clinical Examinations.

F. Block 6 (Neurosciences-1 + Inflammation)

The examination in Block 6 shall be as follows

I. One written paper of 120 marks having two parts

- **a.** Part I shall have eighty-five Multiple Choice Questions (MCQs) of total 85 marks (01 mark for each MCQ) and the time allotted shall be 110 minutes. There will be no negative marking.
- **b.** Part II shall have seven Structured Essay Questions (SEQs) of total 35 marks (05 marks for each SEQ) and the time allotted shall be 70 minutes.

II. Oral Practical/Clinical examination shall have 120 marks in total.

III. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 60 marks, e 20% of the total allocated marks (300) for the block the score will be equality distributed to the Written and Oral/Practical Clinical Examinations.

G. Islamic Studies/Civics and Pakistan Studies

The examination in Islamic Studies/Civics and Pakistan Studies shall be as follows:

I. One written paper of 100 marks in Islamic Studies/Civics and Pakistan Studies having two components:

a. Islamic Studies/Civics component having total 60 marks. There will be three (3) Long Essay Questions (LEQs) to be attempted out of Five (5), having 20 marks each.

b. Pakistan Studies component having total 40 marks. There will be two (2) Long Essay Questions (LEQs) to be attempted out of Four (4), having 20 marks each.

YEAR-2						
Block 4 **Modules** (GIT & Nutrition-I + Renal-I)	Part I MCQs (85)	85 Marks	Practical / Clinical Examination	07 OSPE 02 OSCE 03 OSVE	Marks 56 16 48	**300**
	Part II SEQS (7)	35 Marks				
	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		
	Total	**150**	Total	**150**		
Block 5 **Modules** (Endocrinology & Reproduction-I + Head& Neck, Special Senses)	Part I MCQs (85)	85 Marks	Practical / Clinical Examination	07 OSPE 02 OSCE 03 OSVE	Marks 56 16 48	**300**
	Part II SEQS (7)	35 Marks				
	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		
	Total	**150**	Total	**150**		
Block 6 **Modules** (Neurosciences-I + Inflammation)	Part I MCQsPart II SEQS	85 Marks 35 Marks	Practical / Clinical Examination	120 Marks		**300**
	Internal Assessment	30 Marks	Internal Assessment	30 Marks		
	Total	**150**	Total	**150**		
	Total Marks					**900**
Islamic Studies/ Civics and PakistanStudies	**Islamic Studies/Civics** 3 LEQs of 20 marks each			60 Marks		**100***
	Pakistan Studies 2 LEQs of 20 marks each			40 Marks		
	Total			**100**		

- Total marks for the First and Second Professional Examination shall be 900, each. Marks of Islamic Studies/Civics and Pakistan Studies shall not be counted towards total marks of any professional examination, and determination of position or merit of a candidate. However, the candidate shall have to take the examination in the subject in their Second Professional MBBS Examination. Those failing the subjects in both annual & supplementary examination, while passing all the other subjects of Second Professional

Examination shall be promoted to the 3rd year MBBS, however they will be allowed two more attempts to clear the subject with Second Professional Examination of the next session, failing which they shall be detained in the 3rd Professional MBBS.

13. **No grace marks shall be allowed in any examination or practical under any guise or name.**
14. At least 25% MCQ & 25% SEQ shall be based on applied/case/clinical scenarios to assess high order thinking in the papers set for the students of First and Second Professional MBBS Examination.

11. Exam Regulations by UHS

1. Professional examination shall be open to any student who:
    a. Has been enrolled/registered and completed one academic year preceding the concerned professional examination in a constituent/affiliated College of the University.
    b. Has his/her name submitted to the Controller of Examinations, for the purpose of examination, by the Principal of the college in which he/she is enrolled & is eligible as per all pre-requisites of the examination
    c. Has his/her marks of internal assessment in all the Blocks sent to the Controller Examinations by the Principal of the college along with the admission forms.
    d. Produces the following certificates duly verified by the Principal of his/ her College:
        I. Of good character;
        II. Of having attended not less than (85%) of the full course of lectures delivered and practical conducted in the particular academic session in each Block, as well as in aggregate.
        III. Certificate of having appeared at the Block Examinations conducted by the college of enrolment with at least 50% cumulative percentage in aggregate of blocks 1, 2 and 3 for the first year and blocks 4, 5 and 6 for the second year.
        IV. Candidates falling short of lectures or practical shall not be admitted to the examination but may be permitted to appear at the supplementary examination if they make up the deficiency up to the commencement of the next examination by remaining on the rolls of a college as regular student, subject to fulfillment of all other mandatory requirements to appear at the examination.
2. The minimum number of marks required to pass this examination for each paper shall be fifty percent (50%) in Written and fifty percent (50%) in the Oral/Practical/Clinical examinations and fifty percent (50%) in aggregate, independently and concomitantly at one and the same time.
3. Candidates who secure eighty five percent (85%) or above marks in any of the papers shall be declared to have passed **"with distinction"** in that Block subject to having at least 80 % marks in the Written component of that paper, concomitantly. However, no candidate shall be declared to have passed "with distinction" in any paper, who does not pass in all the papers of the First Professional Examination as a whole at one and the same time.
4. A candidate failing in one or more paper of the annual examination shall be provisionally allowed to join second professional class till the commencement of supplementary examinations. Under no circumstances, a candidate shall be promoted to the second professional class till he/she has previously passed all the papers in the First Professional MBBS Examination.

5. If a student appears in the supplementary examination for the first time as he/she did not appear in the annual examination because of any reason and fails in any paper in the Supplementary Examination, he/she will be detained in the same class and will not be promoted to the next class.
6. Any student who fails to clear First Professional Examination in four consecutive attempts, inclusive of both availed as well as un-availed, after becoming eligible for the examination, and has been expelled on that account shall not be eligible for continuation of studies and shall not be eligible for fresh admission as a fresh candidate in either MBBS or BDS. (Ref. UHS Circulars/137-20/2750 dated 23-11-2020).
7. The colleges may arrange remedial classes and one re-sit for black examination either with the subsequent block examination or before completion of the block, and before or during preparatory leave in case of the terminal block of the professional year, before issuance of the date sheet for the concerned professional examination, subject to the following condition:
    I. At the completion of each block, the principals of the colleges shall submit a detailed report to the university, including cases of students with short attendance poor performance/absence in the block examination along with the reasons and evidence for the same, proposed schedule to remedial classes and re-sit examination.
    II. Competent Authority UHS will have the cause and the submitted evidence evaluated and documented, before permitting the colleges to arrange remedial classes and re-sit examination at the concerned block. No college is allowed to conduct remedial classes or re-sit examination without prior approval of the competent authority
    III. The students can appear in re-sit of a block examination, along with the subsequent block, and before or during preparatory leave for the terminal black of the professional year, once the requirement of attendance is met with However conduct of remedial classes shall be permitted only in the cases of students, who shall have attended at least 50% of total attendance of the concerned block in the first instance
    IV. The valid reasons for short attendance in a block or absence from a block examination may include major illness/accident/surgery of the student or death of an immediate relative/being afflicted by a natural calamity or disaster
8. The application for admission of each candidate for examination shall be submitted to the Controller of Examination, through the Principal of the College, in a prescribed format, as per notified schedule, accompanied by the prescribed fee.
9. The marks of internal assessment and attendance shall be submitted to Controller of Examinations three times, within two weeks of completion of each block examination
10. At the end of each block, the colleges are required to submit question papers and keys for the block examination, internal assessment marks and attendance record to the Department of Examinations UHS. Further, parent-teacher meetings shall be arranged by the colleges after every block examination to share feedback on the progress of students

with their parents, Minutes of parent teacher meetings shall be submitted to the Department of Medical Education UHS.

11. ll is emphasized that fresh internal assessment or a revision of assessment for supplementary examination shall not be permissible. However, a revised internal assessment for the detained students can be submitted. The internal assessment award in a particular year will not be decreased subsequently detrimental to the detainee candidate. A proper record of the continuous internal assessment shall be maintained by the concerned departments in the colleges.
12. The candidates shall pay their fee through the Principals of their respective colleges who shall forward a bank draft / pay order / crossed cheque in favor of Treasure, university of Health Sciences Lahore, along with their Admission Forms.
13. Only one annual and one supplementary of First and Second Professional MBBS Examinations shall be allowed in a particular academic session. In exceptional situations i.e., national calamities, war or loss of solved answer books in case of accident, special examination may be arranged after having observed due process of law. This will require permission of relevant authorities, i.e., Syndicate and Board of Governors.

12. Examination Rules AFMDC

- Students must report to examination hall/ venue at least 30 minutes before the exam.
- Exam will start sharp at time.
- Late comers arriving at the examination hall more than 15 minutes after the start of the paper will not be allowed to enter the examination hall.
- All students should wear Lab coats before appearing in the exam.
- Students are not allowed to take into the examination hall textbooks, notes or manuscript of any kind.
- Students must bring the necessary stationary items for exam with them e.g. pen/pencil/eraser/ball point/sharpener etc.
- Mobile phones and gadgets are strictly prohibited in examination hall. If any student found with Mobile Phone (Silent/Switched off/on) he/she will not be allowed to continue the exam.

13. Table of Specification (TOS)

MBBS 2nd Professional

Block-4

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (8 marks each observed)	OSVE (16 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	23	03	38	03	-	01	40
Normal Function	Physiology applied/clinical	16	02	26	02	-	01	32
	Biochemistry applied/clinical	20	02	30	02	-	01	32
Disease Burden & Prevention	Community Medicine & Public Health	07	-	07	-	-	-	-
	Behavioral Sciences	06	-	06	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	09	-	09	-	-	-	-
	Pharmacology	04	-	04	-	-	-	-
CFRC	CF-2-1	-	-	-	-	01	-	08
PERLs	PERLs-2-1	-	-	-	-	01	-	08
Total		**85**	**7x5=35**	**120**	**07 stations x 08 = 56**	**02 stations x 08 = 16**	**03 stations x 16=48**	**120**

14. Frame work of Block-4 Module Timetable 2023-24

AZIZ FATIMAH MEDICAL & DENTAL COLLEGE FAISALABAD

TABLE 2nd YEAR MBBS CLASS SESSION 2023-24 GIT, Nutrition and Renal Modules (Block I)

DAY	1 08:00 am - 08:45 am	2 08:45 am - 09:30 am	3 09:30 am - 10:30 am	4 10:30 am - 11:30 am	5 11:30 am -12:30 pm	6 12:30 pm - 13:00 pm	6 13:00 pm - 14:00 pm
Monday	Dissection		Physiology	Biochemistry	Anatomy	Break/Namaz Break	PERLS
Tuesday	Dissection		Physiology	Anatomy	Biochemistry		Pharmacology
Wednesday	Dissection		Biochemistry	Practical/SGD			Islamiyat
Thursady	Dissection		Physiology	Practical/SGD			Biochemistry
Friday	08:00 am - 09:00 am Biochemistry	09:00 am - 10:00 am Anatomy	10:00 am - 11:00 am Physiology	11:00 am - 13:00 pm Practical/SGD			Jummah Prayers
Saturday	Dissection		Physiology	Biochemistry	Anatomy		Community Medicine

RESOURCE BOOKS

15. Learning Resources

Anatomy	• Snell's Clinical Anatomy 10th ed. • Langman's Medical Embryology 12th ed • Medical Histology by Laiq Hussain Siddiqui 8th ed. • General Anatomy by Laiq Hussain Siddiqui 6th ed.
Physiology	• Guyton AC and Hall JE. Textbook of Medical Physiology, W.B. Saunders & Co. Philadelphia • Essentials of Medical Physiology by Mushtaq Ahmad
Biochemistry	• Harpers illustrated Biochemistry 32nd edition. Rodwell.V.W MCGrawHill publishers. • Lippincott illustrated Review 8th edition Kluwer.W. • Essentials of Medical Biochemistry vol 1&2 by Mushtaq Ahmed.
Community Medicine	• Parks TextBook of Preventive and Social Medicine, K. Park(Editor) • Public Health and Community Medicine Ilyas Ansari(Editors)
Pharmacology	• Basic and clinical Pharmacology by Katzung. McGraw-Hill • Pharmacology by Champe and Harvey, Lippincott Williams & Wilkins
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.
Medicine	• Davidson's Principles and Practice of Medicine
Surgery	• Bailey & Love Short Practice of Surgery
Islamiyat	• Standard Islamiyat (compulsory) for B.A, B.Sc, MA, Msc, MBBS by Prof. M Sharif Islahi • Ilmi Islamiyat (compulsory) mfor B.A, B.sc & equilent.
Behavioral Sciences	• Handbook of Behaioural Sciences by Prof. Mowadat H. Rana, 3rd Edition. • Medical and Psychosocial Aspects of Chronic illness and Disability Sixth Edition Donna R. Falvo, PHD Beverley E. Holland, PHD RN.