

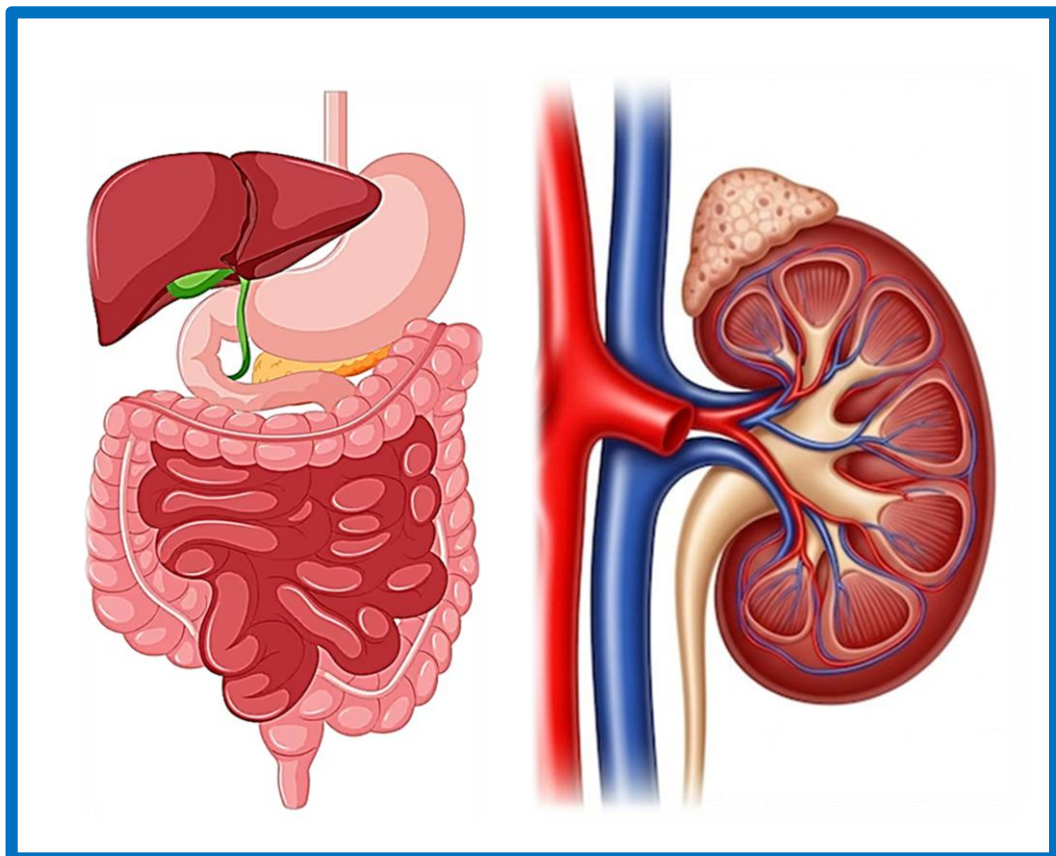


LAHORE
MEDICAL & DENTAL
COLLEGE

STUDY GUIDE

BLOCK 4

(GIT and Nutrition-1, Renal-1)







MISSION OF LMDC

The Lahore Medical & Dental College is committed in its pursuit of excellence to providing the best academic facilities and atmosphere to its students.

Our mission is to:

“Train future leaders of medicine who set new standards in knowledge, care and compassion”.

The well qualified and committed faculty of LMDC provides a combination of nurturing support and challenge to the students to reach their maximum potential.

TABLE OF CONTENTS

	Page No:
I. Mission of LMDC	3
II. Departmental Faculty & Staff Hierarchy	5
III. List of abbreviations	17
IV. Curriculum frame work for year 2	18
V. Introduction to the study guide	18
VI. Introduction to the block-4	18
VII. Block-4 committees	19
VIII. Time tables	21
IX. Distribution and duration of teaching activities amongst different disciplines	23
X. Learning outcomes and themes of block-4	23
XI. Learning objectives (UHS syllabus) of block-4	25
XII. Teaching and learning methodologies (Instructional strategies)	49
XIII. Learning resources	49
XIV. Assessment (Tools, TOS)	50
XV. Assessment policy and eligibility criteria	51

II. DEPARTMENTAL FACULTY & STAFF HIERARCHY

FACULTY OF ANATOMY DEPARTMENT

Sr. #	Name	Designation	Qualification	Pictures
1	Prof. Dr. Iffat Badar	Professor & HOD	MBBS, M.Phil	
2	Dr. Anis Fatima	Associate Professor	MBBS, M.Phil	
3	Dr. Shamaila Ejaz	Assistant Professor	MBBS, M.Phil	
4	Dr. Ahmad Munawar	Demonstrator	MBBS	
5	Dr. Sheharyar Ahmad	Demonstrator	MBBS	
6	Dr. Saliha Noor	Demonstrator	MBBS	
7	Dr. Junaid Mazhar	Demonstrator	MBBS	
8	Dr. Dua Azhar	Demonstrator	MBBS	

9	Dr. Afiq Khan	Demonstrator	MBBS	
10	Dr. Hamza Safdar	Demonstrator	MBBS	
11	Dr. Mahzaib Haider	Demonstrator	MBBS	
12	Dr. Mishal Amjad	Demonstrator	MBBS	
13	Dr. Zovera Khalid	Demonstrator	MBBS	

SUPPORTING STAFF

1. Humayun Sarfaraz (Museum Keeper)
2. M. Ismail Khan (Lab. Assistant)
3. Muhammad Imran (Lab. Assistant)
4. Waseem Sibtain (Lab. Assistant)
5. Amjad Hussain (Office Boy)
6. Tariq Ali (Lab. Attendant)
7. Arif Masih (Embalmer)

FACULTY OF PHYSIOLOGY DEPARTMENT

Sr. #	Name	Designation	Qualification	Pictures
1	Prof. Anser Asrar	Professor & HOD	MBBS, M.Phil, FCPS	
2	Prof. Zaima Ali	Professor	MBBS, M.Phil, Ph.D, CHPE	
3	Prof. Sadia Nazir	Professor	MBBS, M.Phil, CHPE, Ph.D (Scholar)	
4	Prof. Attiqah Khalid	Professor	MBBS, M.Phil, CHPE, Ph.D (Scholar)	
5	Dr. Asma Akram	Assistant Professor	BDS, M.Phil	
6	Dr. Zulfiqar Akram	Senior Demonstrator	BDS, M.Phil	
7	Dr. Abdullah Bin Zubair	Demonstrator	MBBS	
8	Dr. Arooj Fatima	Demonstrator	MBBS	

9	Dr. Hafsa Imran	Demonstrator	MBBS	
10	Dr. Hassnat Ahmed	Demonstrator	MBBS	
11	Dr. Maha Sakhawat	Demonstrator	MBBS	
12	Dr. Meeran Iftikhar	Demonstrator	MBBS	
13	Dr. Rohail Sani	Demonstrator	MBBS	
14	Dr. Yusha Mansha	Demonstrator	MBBS	
15.	Dr. Shoaib Shafique	Demonstrator	MBBS	

SUPPORTING STAFF

1. Mr. M. Ashraf (Lab technician)
2. Mr. Akmal Raza (Lab assistant)
3. Mr. Noor-ul-Hassan (Lab attendant)
4. Mr. Ashfaq (Naib Qasid)

FACULTY OF BIOCHEMISTRY DEPARTMENT

Sr. #	Name	Designation	Qualification	Pictures
1	Prof. Rubina Bashir	Professor & HOD	MBBS, M.Phil	
2	Prof. Sobia Imtiaz	Professor	MBBS, M.Phil, MHPE	
3	Dr. Mahwish Shahzad	Associate Professor	MBBS, M.Phil, CHPE	
4	Dr. Sana Sarmad	Associate Professor	MBBS, M.Phil	
5	Dr. Madeeha Mushtaq	Senior Demonstrator	MBBS, M.Phil	
6	Dr. Maryam Saeed	Demonstrator	MBBS	
7	Dr. Iqra Sarwar	Demonstrator	MBBS	

8	Dr. Zain Atta	Demonstrator	MBBS	
9	Dr. Momin Ali	Demonstrator	MBBS	
10	Dr. Fahad Faisal	Demonstrator	MBBS	
11	Dr. Afeera Talib	Demonstrator	MBBS	
12	Dr. Gul Seira	Demonstrator	MBBS	

SUPPORTING STAFF

1. Mr. Saqib Bashir (Lab technologist)
2. Mr. M. Ahmed (Lab assistant)
3. Mr. Ghulam Dastagir (Lab assistant)
4. Mr. Ali Raza (Lab attendant)
5. Mr. Abdul Qayyum (Office boy)
6. Mr. Waqas Javed (cleaner)

FACULTY OF PHARMACOLOGY DEPARTMENT

Sr. #	Name	Designation	Qualification	Pictures
1	Dr. Ajaz Fatima	Professor & HOD	MBBS, M. Phil, Ph.D (Scholar)	
2	Dr. Asia Firdous	Associate Professor	MBBS, M.Phil	
3	Dr. Ghulam Ovais Qarni	Senior Lecturer	MBBS, M.Phil (Part 1)	
4	Dr. Amina Zubair	Demonstrator	MBBS, M.Phil (Part 1)	

FACULTY OF PATHOLOGY DEPARTMENT

Sr. #	Name	Designation	Qualification	Pictures
1	Dr. Shazia Nilofar	Professor & HOD	MBBS, M. Phil, MHPE	
2	Dr. Saadia Chaudhary	Professor	MBBS, M.Phil, MHPE	
2	Dr. Nazia Ahmad	Associate professor	MBBS, M.Phil, CHPE	
3	Dr. Sonia Tahir	Associate professor	MBBS, M.Phil, CHPE	
4	Dr. Maimoona Aslam	Assistant professor	MBBS, M.Phil , CHPE	

FACULTY OF COMMUNITY MEDICINE

Sr. #	Name	Designation	Qualification	Pictures
1	Prof. Dr. Seema Daud	Professor & HOD	MBBS, MHPE, FCPS, Ph.D	
2	Prof. Dr. Humayun Mirza	Professor	MBBS, MPH, CHPE	
3	Dr. Umbreen Navied	Associate Professor	MBBS, M. Phil, CMT	
4	Dr. Saadia Maqbool	Assistant Professor	MBBS, DMCH, M.Phil, CHPE	

FACULTY OF MEDICINE & SURGERY

Sr. #	Name	Designation	Qualification	Pictures
1	Prof. Shamail Zafar	Professor & HOD	MBBS, FCPS, FACG	
2	Prof. Saquib Zahur	Professor & HOD	MBBS, FCPS	
3	Prof. Sarah Shoaib	Professor	MBBS, FCPS, CMT, CME	
4	Dr. Sidra Shoaib	Associate Professor	MBBS, FCPS	

FACULTY OF MEDICAL EDUCATION

Sr. #	Name	Designation	Qualification	Picture
1	Prof. Nighat Nadeem	Professor & HOD	MBBS, MME	

FACULTY OF DERMATOLOGY

Sr. #	Name	Designation	Qualification	Picture
1	Prof. Haroon Nabi	Professor & HOD	MBBS, FCPS	

FACULTY OF PSYCHIATRY & BEHAVIORAL SCIENCES

Sr. #	Name	Designation	Qualification	Picture
1	Prof. Maqbool Ahmad Khan	Professor & HOD	MBBS,FCPS	
2	Mr. Ebrahim Naeem	Demonstrator	MS. Clinical Psychology	
3	Dr. Tehreem Imtiaz	Demonstrator	MBBS	

III. LIST OF ABBREVIATIONS

A	Anatomy
Ag	Aging
B	Biochemistry
BhS	Behavioral sciences
CM	Community Medicine
C-FRC	Clinical-Foundation Rotation Clerkship
F	Foundation
HL	Hematopoietic & Lymphatic
M	Medicine
P	Physiology
Pa	Pathology
Pe	Pediatrics
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology
Psy	Psychiatry
QI	Quran and Islamiyat
R	Radiology
S	Surgery

IV. CURRICULUM FRAME WORK FOR YEAR 2

YEAR	MODULES	
YEAR 2	• GIT and Nutrition-1 • Renal-1	Block 4
	• Endocrinology and Reproduction-1 • Head and Neck, Special senses	Block 5
	• Neurosciences-1 • Inflammation	Block 6
	• PERLs-2 • Expository-2 • Quran-2 • Islamiyat, Civics • Pakistan Studies	Spiral
	• C-FRC 2 (Clinical-foundation, Rotation, Clerkships)	

V. INTRODUCTION TO THE STUDY GUIDE

As UHS has introduced modular integrated MBBS curriculum 2k23 from the academic session 2022-2023, and final version is released in 2k26, the study guide for Block-4 is developed in order to introduce the second year MBBS students to various modules and blocks in year 2. The learning objectives of all the subjects included in block-4 are added to help learners focus on key areas. Time tables for both the modules in block-4 are added and total contact hours for each subject are given in a tabulated manner. The books and other reading resources are mentioned to facilitate the students. Assessment tools, policy and schedule is also included. Moreover, table of specifications (TOS) for block-4 examination is added to facilitate the learners.

VI. INTRODUCTION TO THE BLOCK-4

Course name:

- Block-4

Year:

- Year-2

Level of students:

- Second year MBBS

Duration of Block-4:

- GIT and Nutrition-1: 5 weeks

- Renal-1: 4 weeks

VII. BLOCK-4 COMMITTEES

A. GIT and Nutrition-1 Module committee:

Module coordinator

- Prof. Iffat Badar, HOD Anatomy

Module co-coordinator

- Dr. Shumaila Ijaz, Associate Prof. Anatomy

Representatives

- Anatomy (Prof. Iffat Badar)
- Physiology (Prof. Sadia Nazir)
- Biochemistry (Prof. Sobia Imtiaz)
- Pharmacology (Prof. Ajaz Fatima, Dr. Amna Zubair)
- Pathology (Prof. Shazia, Dr. Rizwan, Dr. Hira)
- Medicine (Prof. Shamail Zafar, Prof. Sarah)
- Surgery (Prof. Saquib Zahur, Dr. Sidra Shoaib)
- Behavioral Science (Prof. Maqbool Ahmad Khan, Miss Ramla)
- Community Medicine (Prof. Seema Daud, Dr. Humayun Mirza)
- Gynaecology & obstetrics (Prof. Fozia Umber Qureshi)
- Pediatrics (Prof. Rizwan, Dr. Madeeha)
- Deptt of Medical Education (Prof. Nighat Nadeem)
- Radiology (Prof. Khalid Farooq)

B. Renal-1 committee:

Module coordinator

- Prof. Iffat Badar, HOD Anatomy

Module co-coordinator

- Dr. Shumaila Ijaz, Associate Prof. Anatomy

Representatives

- Anatomy (Prof. Iffat Badar)
- Physiology (Prof. Sadia Nazir)
- Biochemistry (Prof. Sobia Imtiaz)
- Pharmacology (Prof. Ajaz Fatima, Dr. Amna Zubair)
- Pathology (Prof. Shazia, Dr. Rizwan, Dr. Hira)
- Medicine (Prof. Shamail Zafar, Prof. Sarah)
- Surgery (Prof. Saquib Zahur, Dr. Sidra Shoaib)
- Community Medicine (Prof. Seema Daud, Dr. Humayun Mirza)
- Gynaecology & obstetrics (Prof. Fozia Umber Qureshi)
- Pediatrics (Prof. Rizwan, Dr. Madeeha)
- Deptt of Medical Education (Prof. Nighat Nadeem)

- Radiology (Prof. Khalid Farooq)

TOR & Duties of Module Committees:

- Module coordinator is nominated from the subject with the maximum content in the respective module
- Module coordinator will head the module committee
- Module coordinator will develop module team for collaboration and consultation with all the relevant subjects
- Module committee will assist in implementation of the curricular guidelines provided by UHS
- Module committee will coordinate with the assessment cell in DME
- Module coordinator will help in developing the study guide in collaboration with DME

PBL COMMITTEE FOR BLOCK-4

Head of PBL committee:

Prof. Iffat Badar, HOD Anatomy

Advisory members:

Prof. Anser Asrar, HOD Physiology

Prof. Rubina Bashir, HOD Biochemistry

Prof. Sobia Imtiaz, Biochemistry

Prof. Nighat Nadeem, HOD, DME

Other members:

Prof. Sadia Nazir, Physiology

Dr. Shumaila Ijaz, Associate Prof. Anatomy

Dr. Mahwish Shahzad, Associate Prof. Biochemistry

Duties of PBL committee:

1. Organize PBL committee meetings
2. Select tutors for PBL sessions
3. Train tutors for PBL sessions
4. Share learning resources with students
5. Design the PBL vignettes and get approval from DME
6. Ensure the availability of resources for effective delivery of PBL
7. Visit the PBL venues for quality assurance

VIII. TIME TABLES (PROPOSED)

GIT AND NUTRITION-1: 5 weeks

Days & time	8:00 am -8:50 am	8:50 am -9:40 am	9:40 am - 11:00 am	11:00 am -11:30 am	11:30 am - 12:15 pm	12:15 pm - 1:00 pm	*1:00 pm - 3:00 pm	
Monday	Biochemistry lecture	Anatomy lecture	Anatomy Dissection	BREAK	Biochemistry lecture	** Pharma/ Pathology lecture	Histo Practical A+ B + C Biochem Practical D+ E + F *** Physio practical/CSF G+ H + I + J	
Tuesday	Biochemistry lecture	Physiology lecture	Anatomy Dissection		Anatomy lecture	Biochemistry lecture	Histo Practical G+ H + I + J Biochem Practical A+ B + C *** Physio practical/CSF D + E + F	
Wednesday	Physiology lecture	Biochemistry lecture	Anatomy Dissection		Behav. Sci lecture	Biochemistry lecture	Histo Practical D + E + F Biochem Practical G+ H + I + J *** Physio practical/CSF A+ B + C	
Thursday	Physiology lecture	Biochemistry lecture	Anatomy Dissection		Comm. Med lecture	Biochemistry lecture	1:00 pm - 2:15 pm	2:15 pm -3:00 pm
Friday	Anatomy lecture	Physiology lecture	Anatomy Dissection		11:30 am-12:15 pm		12:15 am- 1:00 pm	
					*****Isl (Quran) & Pak.St/Comm. Med/Anatomy Lecture		Biochemistry lecture	
						**** SDL	***** PERL/ Behav. Sci lecture	

* SDL for 1-hour practical time

** 1st three weeks pharmacology & last three weeks Pathology

*** 1st four weeks physiology practical and last two weeks CSF

**** SDL will be managed by Anatomy/Physiology/Biochemistry

***** 1st four weeks PERL and last two weeks Behav. Sci

***** 1st four weeks Isl (Quran) & Pak. St, 5th week comm. Med, 6th week Anatomy

RENAL-1: 4 weeks

Days & time	8:00 am - 8:50 am	8:50 am - 9:40 am	9:40 am - 10:30 am	10:30 am - 10:45 am	10:45 am - 11:30 am	11:30 am - 12:15 pm	12:15 pm - 1:00 pm	1:00 pm - 3:00 pm
Monday	Biochem lecture	Physio lecture	Disease prevention ¹	BREAK	Anatomy lecture	Physiology lecture	SDL ²	Histo Practical/CSF ³ A+ B + C Biochem Practical D+ E + F Physio tutorial/ Physio practical ⁴ G+ H + I + J
Tuesday	Anatomy lecture	Physio lecture	9:40 am - 10:50 am Anatomy Dissection	10:50 am - 11:20 am	11:20 am – 12:10 pm	12:10 pm - 1:00 pm	1:00 pm - 3:00 pm	
Wednesday	Physio lecture	Biochem lecture	Anatomy Dissection	BREAK	Physiology/ Pathology lecture ⁵	Biochemistry lecture	Histo Practical/CSF ³ G+ H + I + J Biochem Practical A+ B + C Physio tutorial/ Physio practical ⁴ D + E + F	
Thursday	Physio lecture	Biochem lecture	Anatomy Dissection		PERL lecture	Physiology/ Pathology lecture ⁵	Histo Practical/ CSF ³ D + E + F Biochem Practical G+ H + I + J Physio tutorial/ Physio practical ⁴ A+ B + C	
					Pharmacology lecture	Physiology/ Pathology lecture ⁵	1:00 pm - 2:00 pm Biochemistry/ Aging lecture ⁶	2:00 pm - 3:00 pm Isl (Quran) & Pak studies lecture
Friday	Anatomy lecture	Biochem lecture	9:40 am - 10:30 am Physiology lecture	10:30 am - 11:20 am SDL ²		11:20 am - 12:10 pm Biochemistry lecture	12:10 am- 1:00 pm Physiology/ Pathology lecture ⁵	

1. Disease prevention will be managed by Behav. Sci and Comm. Medicine

2. SDL will be managed by Anatomy/Physiology/Biochemistry

3. 1st two weeks Histology practical and last two weeks CSF

4. 1st three weeks Physiology tutorial and last week physiology practical

5. 1st two weeks Physiology and last two weeks Pathology

6. 1st two weeks Biochemistry and last two weeks Aging

- SDL for 1-hour practical time
- SDL on every Friday from 1:00 -3:00 pm.

IX. DISTRIBUTION AND DURATION OF TEACHING ACTIVITIES AMONGST DIFFERENT DISCIPLINES

GIT AND NUTRITION-1:

- Anatomy (62 hours)
- Physiology (26 hours)
- Biochemistry (51 hours)
- Aging (01)
- Pathophysiology & Pharmacotherapeutics (07 hours)
- Disease prevention & impact (09 hours)
- Medicine & Surgery (C-FRC-2: 08 hours)
- PERL (7.5 hours)
- Holy Quran (03 hours)

RENAL-1:

- Anatomy (29 hours)
- Physiology (38 hours)
- Biochemistry (33 hours)
- Aging (02)
- Pathophysiology & Pharmacotherapeutics (15)
- Disease prevention & impact (04 hours)
- Medicine & Surgery (C-FRC-2: 04 hours)
- PERL (4.5 hours)
- Holy Quran /Isl & Pak studies (03 hours)

X. LEARNING OUTCOMES AND THEMES OF BLOCK-4

GIT & NUTRITION-I MODULE

Module outcomes:

- 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

Module 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

RENAL-I MODULE

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.

Module 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 pressure

XI. LEARNING OBJECTIVES (UHS SYLLABUS) OF BLOCK-4

GIT & NUTRITION-I MODULE LOs

NORMAL STRUCTURE

GROSS ANATOMY

Human Anatomy

GIT-A-001: Oral cavity

- 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

GIT-A-002: 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 lymphatics and related clinical correlates-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

GIT-A-004: Peritoneum

- Trace the horizontal and vertical peritoneal reflections
- 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
- Describe the nerve supply of peritoneum
- Describe the anatomical basis and manifestations of the following:
 - Peritonitis and ascites
 - Peritoneal adhesions (and adhesiostomy)
 - Abdominal paracentesis

GIT-A-005: 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)

GIT-A-006: 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

GIT-A-007: Small & large intestine

- Describe the location, position, parts, relations, neurovascular supply and lymphatic drainage of duodenum, jejunum and ileum (small intestine)
- 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

GIT-A-008: 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 portosystemic 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 subphrenic spaces.

GIT-A-009: 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

GIT-A-010: 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

GIT-A-011: 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

GIT-A-012: Sigmoid colon, rectum & anal Canal

- Describe the gross anatomical features, peritoneal relations, blood supply, nerve supply and lymphatic drainage of cecum, ascending and descending colon, sigmoid colon, rectum and anal canal
- Describe the anatomical basis for Sigmoidoscopy, rectal prolapse, rectal examination, rectal cancer and hemorrhoids

GIT-A-013: Surgical Intervention (Integrate with surgery)

- 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

Embryology

GIT-A-014: 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

GIT-A-015: Foregut

- Describe the formation and divisions of gut tube
- Describe the molecular regulation of gut tube development.
- 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 molecular regulation of liver.
- Describe the embryological basis of intrahepatic and extrahepatic biliary atresia
- Describe the development of pancreas
- Describe the molecular regulation of pancreas.
- Describe the embryological basis of annular pancreas

GIT-A-016: Midgut

- Describe the development of midgut especially mentioning physiological herniation, rotation, retraction of herniated loops and mesenteries of the intestinal loops
- Describe the embryological basis of the following
 - mobile cecum
 - volvulus
 - retro colic hernia
 - omphalocele
 - gastroschisis
- Describe the embryological basis of Meckel's diverticulum
- Describe the embryological basis of;
 - Gut rotation defects
 - Gut atresia and stenosis

GIT-A-017: Hindgut

- 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)

Histology

GIT-A-018: 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

GIT-A-019: Stomach

- Describe the light microscopic structure of stomach
- Describe the role of parietal cells in pernicious anemia

GIT-A-020: 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

GIT-A-021: Large Intestine

- Describe the light microscopic structure of
 - Colon
 - Appendix
 - Rectum
- Define colorectal cancer, anal abscess, hemorrhoids

GIT-A-022: Accessory Organs

- Describe the light microscopic structure of:
 1. Liver
 2. Gall Bladder
 3. Pancreas

PRACTICAL:

Histology Practical

GIT-A-023: Oral Cavity

- Identify, draw and label the histological sections of tongue and lips and enumerate points of identification

GIT-A-024: Salivary Gland

- Identify, draw and label the histological sections of salivary glands (Submandibular, Sublingual and Parotid)

GIT-A-025: 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

GIT-A-026: Small Intestine

- Identify, draw and label the histological structure of small intestine (Duodenum, Jejunum, and Ileum) and enumerate points of identification

GIT-A-027: Large Intestine

- Identify, draw and label the histological structure of large intestine and enumerate points of identification

GIT-A-028: Organs associated with GIT

- Identify, draw and label the histological sections of Gall bladder, liver and enumerate points of identification
- Identify, draw and label the histological sections of pancreas and enumerate points of identification

GIT-A-029: Lymphatic tissue associated with GIT

- Identify, draw and label the histological sections of Palatine tonsil, appendix, Peyer's patches and enumerate points of identification

NORMAL FUNCTION

MEDICAL PHYSIOLOGY

GIT-P-001: 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/Splanchnic circulation
- Explain the nervous control of GIT blood flow/Splanchnic circulation

GIT-P-002: 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 involuntary stage of swallowing
- Explain the effect of swallowing on respiration
- Discuss the mechanism of esophageal stage of swallowing
- Enlist causes of dysphagia (integrates with Surgery)
- Explain the types and role of different peristalsis originating in esophagus
- Discuss the role of Lower Esophageal Sphincter (Gastroesophageal)
- Discuss the pathophysiology of achalasia & Mega esophagus
- Enlist the features and treatment of achalasia

GIT-P-003: 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 entero-gastric inhibitory reflexes
- Enumerate the causes, features, and pathophysiology of gastritis (integrates with Medicine)
- Explain the physiological basis of each feature of gastritis (integrates with Medicine)
- Recommend treatment of gastritis (integrates with Medicine)
- Enumerate the causes, features, and pathophysiology of peptic ulcer (integrates with Medicine)
- Explain the physiological basis of each feature of peptic ulcer (integrates with Medicine)

GIT-P-004: Small Intestine

- Enumerate and explain the secretions and movements of small intestine
- Explain the term “peristaltic rush”
- Explain the functions of ileocecal valve and sphincter
- Enumerate the types of intestinal sprue (integrates with Medicine)
- Enlist the features of intestinal sprue (integrates with Medicine)
- Explain the consequences of sprue on the body (integrates with Medicine)

GIT-P-005: 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 (integrates with Medicine)
- Describe the cause of Hirschsprung's disease (integrates with Medicine)

GIT-P-006: 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 (Integrate with Surgery)

GIT-P-007: Pancreas

- Explain function and secretions of pancreas
- Enlist the causes and pathophysiology of acute and chronic pancreatitis (Integrate with Medicine)
- Enumerate the features of acute pancreatitis and explain the physiological basis of each feature of pancreatitis (Integrate with Medicine)

GIT-P-008: 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

GIT-P-009: Acute & Chronic Diarrhea (Integrated with Medicine and Gastroenterology)

- Define Acute Diarrhea
- Define Chronic Diarrhea
- Enlist various causes for acute and chronic diarrhea

PRACTICAL

PHYSIOLOGY

GIT-P-010: Cranial nerve

- Demonstrate Cranial Nerves V, IX & X testing

BIOCHEMISTRY

GIT-B-001: 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).

GIT-B-002: Carbohydrate metabolism/Entry of glucose into cells

- Elaborate key features of various transport systems for entry of glucose into cells.

GIT-B-003: 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

GIT-B-004: 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.
- Clearly differentiate between substrate level phosphorylation and oxidative phosphorylation

GIT-B-005: 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.

GIT-B-006: Carbohydrate metabolism/Kreb's Cycle

- Describe the TCA cycle along with regulation & significance. Calculate the energy yield of TCA

GIT-B-007: 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 glucose alanine cycle

GIT-B-008: 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.

GIT-B-009: Carbohydrate metabolism/ Hexose Monophosphate Pathway (HMP)

- 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 glucose-6-phosphate dehydrogenase (G6PD) deficiency based on given data

GIT-B-010: Carbohydrate metabolism/Uronic acid pathway & sorbitol pathway

- Describe the reactions, regulation, and biomedical importance of uronic acid pathway and sorbitol pathway

GIT-B-011: Carbohydrate metabolism/Ethanol metabolism

- Outline the reactions involved in ethanol metabolism.
- Explain how ethanol consumption causes hypoglycemia and fatty liver.

GIT-B-012: 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.

GIT-B-013: 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.

GIT-B-014: 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.

GIT-B-015: Nutrition/Special nutritional requirements (Integrate with Community Medicine)

- 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.

GIT-B-016: Nutrition/PEM (Integrate with Community Medicine/Pediatrics)

- 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

GIT-B-017: 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

GIT-B-018: Nutrition/BMR

- Define basal metabolic rate (BMR)
- Elaborate the effect of various physiological and pathological factors on BMR.

GIT-B-019: Nutrition/BMI & Obesity (Integrate with Community medicine)

- Define body mass index (BMI).
- Categorize individuals into underweight, normal, overweight, obese, and morbidly obese based on their 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

GIT-B-020: Malnutrition

- Define Marasmus and Kwashiorkor (Integrate with pediatrics)
- Define Malnutrition (Integrate with Medicine, Gastroenterology)
- Identify various causes of malnutrition (Integrate with Medicine, Gastroenterology)
- Identify the risk factors of malnutrition (Integrate with Medicine, Gastroenterology)
- Outline treatment strategies (Integrate with Medicine, Gastroenterology)

PRACTICAL

BIOCHEMISTRY

GIT-B-021: 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.
- Interpret the graphs related to GCT & GTT
- Determine urine glucose by dipstick method and- by chemical method & interpret the result.
- Estimate serum amylase and interpret the result.

GIT-B-022: Interpretation of results

- Calculate BMI of given subject and interpret the results

AGING

COMMUNITY MEDICINE

GIT-CM-001: Preventive Medicine in Geriatrics

- Identify causes and risk factors for malnutrition in elderly
- Outline treatment strategies

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

PHARMACOLOGY

GIT-Ph-001: Anti Diarrheal Drugs

- Classify anti diarrheal drugs and describe the pharmacokinetics, mechanism of action, pharmacological effects, uses and adverse effects

PRACTICAL

GIT-Ph-002: ORS

- Preparation and calculation of oral rehydration salt (ORS)

PATHOLOGY

GIT-Pa-001: Gastritis

- Define gastritis
- Enlist the types of gastritis
- Describe the morphological features of gastritis
- Describe salient features of acute & chronic gastritis

GIT-Pa-002: Peptic Ulcer

- Describe the salient feature (etiology, pathogenesis and morphology) of peptic ulcer disease
- Discuss the role of H. Pylori in causing peptic ulcer disease (Microbiology)

MICROBIOLOGY

GIT-Pa-003: Infectious agents causing diarrhea

- Enumerate common infectious agents of diarrheal diseases
- Discuss pathogenesis and clinical features of common pathogens

PRACTICAL

PATHOLOGY

GIT-Pa-004: Gastritis

- Identify microscopic features of:
Acute and Chronic Gastritis
H. Pylori Induced Gastritis

DISEASE PREVENTION & IMPACT

BEHAVIORAL SCIENCES

GIT-BhS-001: Health related behaviors

- Identify health related behaviors and apply principles of learning to modify eating

and addictive patterns

GIT-BhS-002: Health related beliefs

- Discuss health belief model and its application in managing common presentations related to gastrointestinal system
- Explain the transtheoretical model of changing behaviors to modify the diseases pattern

GIT-BhS-003: Management of Obesity

- Describe motivational interviewing and outline a management plan to help the individuals with obesity and diabetes to lose weight

GIT-BhS-004: Medically Undescribed Symptoms

- Describe and distinguish Medically Undescribed 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)-

GIT-BhS-005: Role of nutritional deficiencies in mental development

- To identify effect on mental development of nutritional deficiencies

COMMUNITY MEDICINE

GIT-CM-001: 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

GIT-CM-002: 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)

GIT-CM-003: 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

C-FRC-2:

GIT and Nutrition-1

- Demonstrate steps of abdominal examination
- Demonstrate the procedure of shifting dullness
- Identify organs on X-ray abdomen
- Assess dehydration in infant/young child and explain procedure of making home made ORS

PERLs:

GIT and Nutrition-1

PERLs 2-001: Professionalism

Self-awareness & Improvement Planning

- Appreciate the need to develop self-awareness by reflecting on personal strengths and areas for improvement, and create actionable improvement plans to enhance academic performance and professional development.
- Conduct a self-assessment to identify their strengths and weaknesses in academic and clinical tasks, and create a detailed improvement plan to address areas where growth is needed.

PERLs 2-002: Leadership

Role Modelling via Mentoring Session III

- Participate in a mentoring session where to discuss their strengths and weaknesses with their mentor, receive feedback, and collaboratively create an action plan for personal and professional development.
- Share self-Assessment report with mentors for further guidance.

PERLs 2-003: Ethics

Patient Confidentiality

- Discuss the ethical principles of patient confidentiality, including the importance of protecting patient information and the legal and professional consequences of breaching confidentiality.
- Review a clinical scenario involving patient confidentiality and identify how the principles of confidentiality were maintained or breached, proposing strategies for improvement where necessary.

PERLs 2-004: Leadership

Basics of Teamwork

- Describe the roles and responsibilities of a team member in healthcare, including the importance of collegiality & effective information sharing
- Describe the stages of team dynamics
- Appraise how team dynamics influence performance and outcomes.
- Self-assessment as a team member/leader using e.g. The Blake and Mouton Managerial Grid Leadership Self-Assessment Questionnaire

PERLs 2-005: Research

Research Question

- Discuss how to select a suitable research topic.
- Select a research title (based on public health relevance, innovation, feasibility, acceptability, and cost-effectiveness).

Renal Module:

NORMAL STRUCTURE

GROSS ANATOMY

Human Anatomy

R-A-001: Posterior Abdomen Wall

- Describe the fascia of posterior abdominal wall with its clinical significance-Psoas Fascia & Tuberculosis.
- Describe the posterior abdominal wall muscles, arteries (abdominal aorta), veins (inferior vena cava), lymphatics, & clinical correlates.

R-A-002: Kidney

- Describe gross features and fascial 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

R-A-003: 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

R-A-004: Urinary bladder

- Describe the gross anatomical features, relations, surfaces, blood supply, nerve supply and lymphatics of urinary bladder
- Give the clinical correlates of urinary bladder
- Identify the gross features and surfaces of urinary bladder

R-A-005: Sign/symptom investigations (Integrate with Urology)

- Interpret basic urological signs/symptoms & investigations.

R-A-006: Urinary retention (Integrate with Urology)

- Describe the etiology, and management of urinary retention.

R-A-007: Radiograph (Integrate with Radiology)

- Identify and describe the various anatomic landmarks of the renal system on radiographs.

R-A-008: Urethra

- Describe the parts of urethra

EMBRYOLOGY & POST-NATAL DEVELOPMENT

Embryology

R-A-009: Development of urinary system

- Describe 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 molecular regulation of kidney development.
- Describe the development of urinary bladder and urethra
- List and describe the common congenital anomalies of kidney, urinary bladder and urethra.

MICROSCOPIC STRUCTURE

Histology

R-A-01: Structure of kidney

- Describe the histological, structural organization and functions of kidney with clinicals

R-A-0101: Juxtaglomerular apparatus

- Describe the light and ultrastructure of Juxtaglomerular apparatus and glomerular filtration barrier

R-A-012: Structure of ureter

- Describe the histological structure of ureter

R-A-013: Structure of urinary bladder

- Describe the histological structure of urinary bladder
- Discuss clinical correlates (Cystitis, Urinary bladder cancer, Urinary Tract Infections (UTIs))

PRACTICAL

HISTOLOGY

R-A-014: Kidney

- Identify and draw and label the histological structure of kidney and enumerate points of identification

R-A-015: Ureter

- Identify, draw and label the histological structure of ureter and enumerate its points of identification

R-A-016: Urinary bladder

- Identify, draw and label the histological structure of urinary bladder and enumerate its points of identification

R-A-017: Action, Classification and effects of diuretics

- Diagram showing site of action of diuretics, classification of diuretics
- table showing the effect of various diuretics on urinary electrolytes and pH.

NORMAL FUNCTION

MEDICAL PHYSIOLOGY

R-P-001: Physiological anatomy of kidneys

- Explain the general organization of the kidney and urinary tract
- Explain the physiological anatomy of the nephron

R-P-002: Renal Blood Supply

- Explain the renal blood supply

R-P-003: 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
- Enlist the methods to measure body fluids volumes.

R-P-004: Edema (Integrate with Medicine)

- Enumerate causes of Intracellular and extracellular edema
- Describe safety factors that prevent edema

R-P-005: Function

- Explain the functions of the kidney

R-P-006: 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

R-P-007: Abnormalities of micturition (Integrate with Pathology)

- 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

R-P-008: 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

R-P-009: Glomerular filtration

- Define Glomerular Filtration Rate (GFR).
- Describe the determinants of GFR
- Explain the factors affecting GFR
- Discuss the hormones and autocooids 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

R-P-010: 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

R-P-011: Clearance method

- Explain the use of clearance method to quantify kidney function

R-P-012: Transport maximum

- Describe mechanism of re-absorption of sodium along different parts of 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

R-P-013: 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

R-P-014: Obligatory urine volume

- Define and explain the term obligatory urine volume.
- Define and explain free water clearance.
- Define Urine specific gravity.

R-P-015: Disorders of urine concentrating ability

- Enumerate different abnormalities of urinary concentrating ability

R-P-016: Diabetes Insipidus (Integrate with Medicine)

- 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

R-P-017: Osmoreceptor-ADH Feedback System

- Make the flow chart to show the osmoreceptor antidiuretic 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

R-P-018: Thirst

- Explain the mechanism of thirst

R-P-019: 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

R-P-020: Control of ECF osmolarity

- Explain the control of extracellular fluid osmolarity and sodium concentration

R-P-021: 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

R-P-022: Renal regulation of calcium and renal regulation of phosphate

- Explain the renal handling of calcium concentration to regulate plasma calcium concentration
- Enumerate the factors that alter renal calcium
- Enlist the factors that alter renal phosphate excretion

R-P-023: Renal body fluid feedback control

- Explain the nervous and hormonal factors that increase the effectiveness of renal body fluid feedback control

R-P-024: ECF and blood volume

- Explain the conditions that cause large increase in blood volume and ECF volume
- Explain the conditions that cause large increase in ECF volume but with normal blood volume

R-P-025: Acid base balance

- Explain the renal handling of H^+ ion.

R-P-026: Acid base disturbance

- Analyze the acid base disturbances on the basis of pH, HCO_3^- and CO_2
- 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

R-P-027: Anion gap

- Define and explain anion gap

PRACTICAL

PHYSIOLOGY

R-P-028: 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

MEDICAL BIOCHEMISTRY

R-B-001: Purine metabolism

- Discuss the synthesis and degradation of purines (De-Novo and salvage pathway)

R-B-002: Pyrimidine metabolism

- Discuss the synthesis and degradation of pyrimidines (De-Novo and salvage pathway)

R-B-003: Nucleotide metabolism

- Outline the sequence of reactions that converts IMP to AMP and GMP and to their corresponding triphosphates

R-B-004: Regulation of purine and pyrimidine

- Discuss the regulation of purine and pyrimidine biosynthesis and degradation

R-B-005: Purine metabolism disorders

- Interpret the Lesch-Nyhan syndrome. Gout, SCID/ADA on basis of sign symptoms and data

R-B-006: Pyrimidine metabolism disorders

- Interpret Orotic aciduria in relevance to nucleotides and urea
- Differentiate between CPS I and II

R-B-007: Analogues of nucleotides

- Interpret the role of synthetic analogues of nucleotides in medicine based on sign/symptoms and data e.g., Methotrexate, 5 Fluorouracil and Allopurinol.
- Interpret the role of PABA analogs and mycophenolic acid in purine biosynthesis

R-B-008: Role of Ribonucleotide reductase

- Discuss the role of Ribonucleotide reductase in Nucleotide metabolism (hydroxyurea)

R-B-009: Acid Base balance imbalance/Types of acid base disorders (Integrate with Medicine)

- 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.

R-B-010: Acid Base balance imbalance /Tetany in alkalosis

- Interpret metabolic and respiratory disorders of acid base balance on basis of sign, symptoms and arterial blood gases (ABGs) findings
- Give biochemical explanation for tetany associated with alkalosis.

PRACTICAL

R-B-011: Interpretation of results

- Estimate blood urea, creatinine & creatinine clearance and interpret the results.
- Determination of proteins in urine by dipstick method and by chemical methods & interpret your results.
- Estimate serum uric acid by kit method

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

PHARMACOLOGY & THERAPEUTICS

R-Ph-001: 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.

PRACTICAL

R-Ph-002: Diuretics

- Label the diagram showing the site of action of diuretics along with examples
- Tabulate the effects of various diuretics on urinary electrolytes and pH

PATHOLOGY

R-Pa-001: Renal Stones

- Discuss the etiology and pathogenesis of different types of stones

R-Pa-002: Hydronephrosis

- Identify the causes, morphological aspect & outcome of hydronephrosis.

R-Pa-003: Pyelonephritis

- Define pyelonephritis and enumerate its types.
- Describe the morphological features of acute and chronic pyelonephritis

R-Pa-004: Cystitis

- Define acute and chronic cystitis.
- Describe morphological features of different types of cystitis.

MICROBIOLOGY

R-Pa-005: UTI causative agents

- Enlist common causative agents of urinary tract infections and describe pathogenesis and clinical features of common causative agents of UTI.

R-Pa-006: Glomerulonephritis (Integrate with Medicine)

- Define various presentations of glomerulonephritis. e.g asymptomatic proteinuria or hematuria detected during routine testing, nephrotic syndrome, acute nephritic syndrome, and rapidly progressive glomerulonephritis (RPGN).
- Define nephrotic and nephritic syndrome.

R-Pa-007: Acute Kidney Injury (Integrate with Medicine)

- Define acute kidney injury (AKI)
- Identify various risk factors and causes for AKI.
- Outline management strategies

R-Pa-008: Urinary tract infection (Integrate with Medicine)

- Define Urinary Tract Infection (UTI)
- Identify various risk factors and causes of UTI.
- Describe signs and symptoms of UTI.
- Outline management strategies.

PRACTICAL

R-Pa-009: Pyelonephritis

- Identify morphological features of acute pyelonephritis
- Identify morphological features of Chronic pyelonephritis

DISEASE PREVENTION AND IMPACT

COMMUNITY MEDICINE AND PUBLIC HEALTH

R-CM-001: 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

R-BhS-001: 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.

AGING

COMMUNITY

R-Ag-001: Disease prevention

- To define preventive care in diseases related to urinary system(adults).
- Primary, secondary, and tertiary prevention.

MEDICINE

R-Ag-002: Urinary incontinence

- Define urinary incontinence.
- Outline management strategies.

C-FRC-2

Renal-1

- Detail the steps of urinary catheterization in females
- Detail the steps of urinary catheterization in males

PERLs

RENAL-1

PERLs 2-006: Professionalism

Time Management

- Discuss the importance of effective time management in medical education and practice, and develop strategies to prioritize tasks, manage academic responsibilities, and maintain a healthy work life balance.
- Create a weekly schedule that prioritizes academic tasks, clinical work, and personal activities, demonstrating their ability to manage time effectively

PERLs 2-007: Ethics

Informed Consent

- Discuss the ethical and legal principles of informed consent, including the patient's right to make autonomous decisions based on clear, accurate, and comprehensive information about their treatment options, risks, and benefits.
- Review a case scenario and practice obtaining informed consent, ensuring they provide clear explanations of the risks, benefits, and alternatives, and confirming patient understanding.

PERLs 2-008: Leadership

Patient Counselling about disease

- Discuss the principles of effective patient counseling, focusing on clear and empathetic communication to explain disease conditions, treatment options, and lifestyle modifications, ensuring patient understanding and engagement in their care.
- Practice counseling a simulated patient about a disease, using clear, empathetic communication to explain the diagnosis, treatment options, and necessary lifestyle changes, while ensuring the patient's understanding.

PERLs 2-009: Research

Research questions

- Discuss the principles of constructing an evidence-based argument, including developing a clear research question.
- Formulate research questions using PICO/PEO format.

XII. TEACHING AND LEARNING METHODOLOGIES (INSTRUCTIONAL STRATEGIES)

- Large Group Interactive Session (LGIS)
- Team based learning (TBL)
- Problem based learning (PBL) and Case based learning (CBL)
- Tutorials
- Reflective Writing
- Bedside Teaching
- Simulation
- Skill laboratories
- Clinical Case based Conference
- Laboratory Practical
- Ward Rounds
- Demonstrations
- Case Presentations

XIII. LEARNING RESOURCES

Books, handouts, and log books:

Books:

Anatomy

- Langman's Medical Embryology
- Snell's Clinical Anatomy
- Snell's Clinical Neuroanatomy
- Laiq H.S Medical Histology
- Laiq H.S General Anatomy

Physiology

- Guyton AC and Hall JE. Textbook of Medical Physiology
- Essentials of Medical Physiology by Mushtaq Ahmad

Biochemistry

- Harper's Biochemistry
- Lippincott's Illustrated Reviews Biochemistry
- ABC of clinical genetics by H.M. Kingston

Pathology

- Vinay Kumar, Abul K. Abbas and Nelson Fausto. Robbins and Cotran, Pathologic basis of disease.
- Richard Mitchell, Vinay Kumar, Abul K. Abbas and Nelson Fausto. Robbins and Cotran, Pocket companion to Pathologic basis of disease

- Walter and Israel General Pathology

Pharmacology

- Basic and clinical Pharmacology by Katzung
- Pharmacology by Champe and Harvey, Lippincott

Behavioral Sciences

- Handbook of Behavioral Sciences by Prof. Mowadat
- Medical and Psychosocial Aspects of Chronic Illness and Disability

Community Medicine

- Parks Textbook of Preventive and Social Medicine
- Public Health and Community Medicine Ilyas

Surgery

- Bailey & Love' Short practice of Surgery

Medicine

- Davidson's Principles and Practice of Medicine

Islamiyat

- Standard Islamiyat (compulsory) for MBBS by Prof. M. Sharif Islahi
- Ilmi Islamiyat (compulsory) for BA, BSc & equivalent

XIV: ASSESSMENT (TOOLS, TOS)

- **Tools for formative and summative assessments:**
 - Written examination: MCQs
 - Oral/Practical/Clinical: OSPE, OSCE, Structured Viva (OSVE)

MBBS YEAR-2						
Block 4 Modules GIT & Nutrition-1 + Renal-1)	Part I MCQs (140)	140 marks	Practical/ Clinical Examination	11 OSPE 02 OSCE 03 OSVE	Marks 88 10 42	350
	Internal Assessment 10%	35 marks	Internal Assessment 10%	35 marks		
	Total	175	Total	175		

Note:

- Time for 140 MCQs will be 2 Hours 30 minutes.
- Time for each OSPE, OSCE and OSVE station will be six (06) minutes.
- No grace marks shall be allowed in any examination or practical under any guise or name.

- TOS for block-4 examination:

THEME	SUBJECT	WRITTEN EXAM		ORAL/PRACTICAL/CLINICAL EXAM			
		MCQs (1 Mark)	Marks	OSPE (8 Marks each) observed	OSCE (5 Marks each) observed	OSVE (14 Marks each) observed	Marks
Normal structure	Anatomy applied/clinical	38	38	4	-	1	46
Normal Function	Physiology applied/clinical	28	28	3	-	1	38
	Biochemistry applied/clinical	37	37	2	-	1	30
Disease Burden & Prevention	Community Medicine & Public Health	6	6	-	-	-	-
	Behavioral Sciences	5	5	-	-	-	-
Pathophysiology & Pharmacotherapeutics	Pathology	16	16	1	-	-	8
	Pharmacology	10	10	1	-	-	8
CFRC	CF-2	-	-	-	1	-	5
PERLs	PERLs-2	-	-	-	1	-	5
Total		140	140	11 stations x 8=88	2 stations x 5=10	3 stations X 14=42	140

XV. ASSESSMENT POLICY AND ELIGIBILITY CRITERIA

Regulations:

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 prerequisites of the examination.
 - c. has his/her marks of internal assessment in all the Blocks/Clinical Clerkships sent to the Controller of Examinations through office of the Principal of the concerned college, at the end of each Block/Clinical Clerkships, as well as at the conclusion of the academic session along with the admission form for the professional examination.
 - d. Has been certified by the principal of his/her college:
 - i. of good character;

- ii. of having attended not less than cumulative 75%* of the full course of lectures delivered, practical and clinical rotations conducted in the particular academic session, while maintaining 75 % attendance in each Block/Clinical Clerkship,
 - iii. of having appeared at the Block/Clinical Clerkship Examinations conducted by the college of enrolment with at least 50 % marks* in each Block/Clinical Clerkship examination, as well as in aggregate score of all Blocks/Clinical Clerkships examinations for the concerned year;
- 2. Written/Theory paper in all Professional Examinations in Modular Integrated MBBS or BDS Curricula shall consist of MCQs alone, with effect from Annual 2026 Examinations. (Ref: No. UHS/REG-25/2379, dated 17.11.2025)
- 3. The minimum number of marks required to pass the professional examination for each Block/Clinical Clerkship 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.
- 4. A candidate failing in one or more Blocks/Clinical Clerkships in the annual examination shall be provisionally allowed to join the next professional class till the commencement of supplementary examinations. The candidate, however, shall have to pass the failed Block/s or Clinical Clerkship in this supplementary examination failing which he / she shall be detained in the professional year. Under no circumstances, a candidate shall be promoted to the next professional class till he/she has previously passed all the Blocks/Clinical Clerkships in the preceding professional examination. If a student appears in the Supplementary Examination for the first time as he/she did not appear in the annual examination for any reason and failed in any Block/Clinical Clerkship in the Supplementary Examination, he/she will be detained in the same class and will not be promoted to the next class. *Notification No. UHS/REG-25/2351 Dated 13-11-2025
- 5. Only one annual and one supplementary of each Professional Examination shall be allowed in a particular academic session. However, 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.
- 6. Any student who fails to clear the First or Second Professional MBBS / First Professional BDS Examination, in four consecutive attempts, each, inclusive of both availed as well as un-availed attempts, 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 admission as a fresh candidate in either MBBS or BDS.
- 7. The application for admission of each candidate to the professional examination shall be submitted to the Controller of Examination, through the Principal of the College, on the prescribed format, as per notified schedule, accompanied by the prescribed fee.

8. The candidates shall pay their fee through the principal of their respective Colleges, who shall forward the Examination Forms along with the duly paid challan of the examination fee generated from the Online Examination Form.
9. The continuous internal assessment through the Block/Clinical Clerkship, conducted by the college of enrollment, shall carry 20% weightage in the total allocated marks for the concerned Block/Clinical Clerkship in the Professional Examination conducted by the university. The score will be equally distributed to the Written and "Oral/Practical/Clinical" Examinations.
10. The marks of internal assessment through Blocks/Clinical Clerkships examination and attendance record shall be submitted to Controller of Examinations, along with question papers and keys for the Block/Clinical Clerkship examination, within two weeks of completion of each Blocks/Clinical Clerkships examination. Further, parent-teacher meetings shall be arranged by the colleges after every Block/Clinical Clerkship examination to share feedback on the progress of students with their parents. Minutes of parent teacher meetings, academic timetables/schedule of Blocks/Clinical Clerkships and academic year study guides shall be submitted to the Department of Medical Education UHS, as well.
11. It 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 department/s in the colleges.
12. The colleges may arrange remedial classes and one re-sit for each Block/Clinical Clerkship examination after fulfillment of prescribed requirements. The remedial classes and re-sit examination can be conducted during summer vacation/weekends, before or during preparatory leave for the concerned professional examination.