

Balanced Diet Health and Nutrition

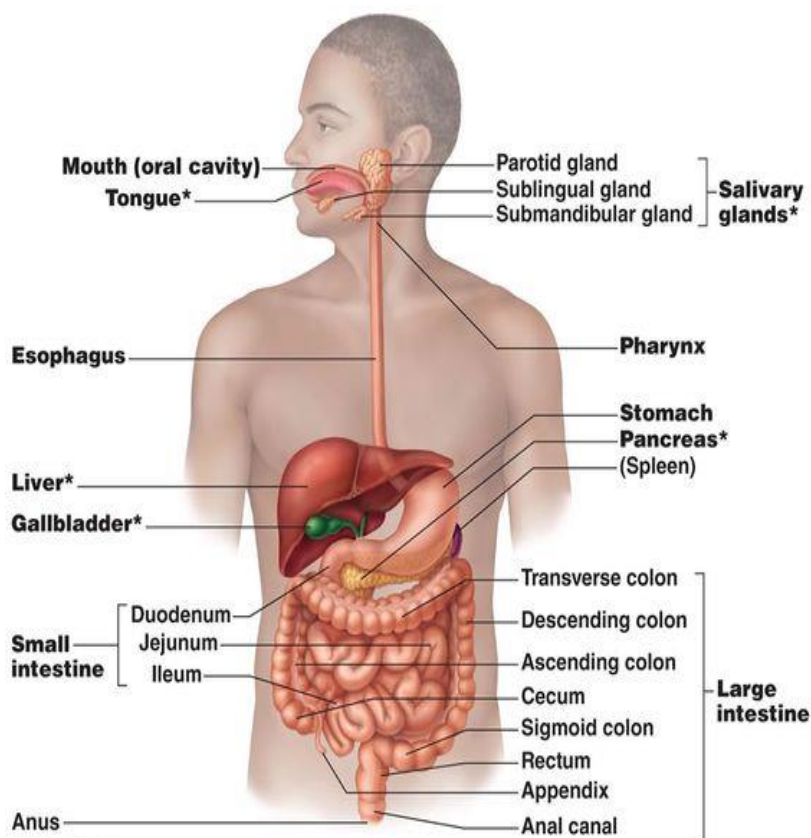
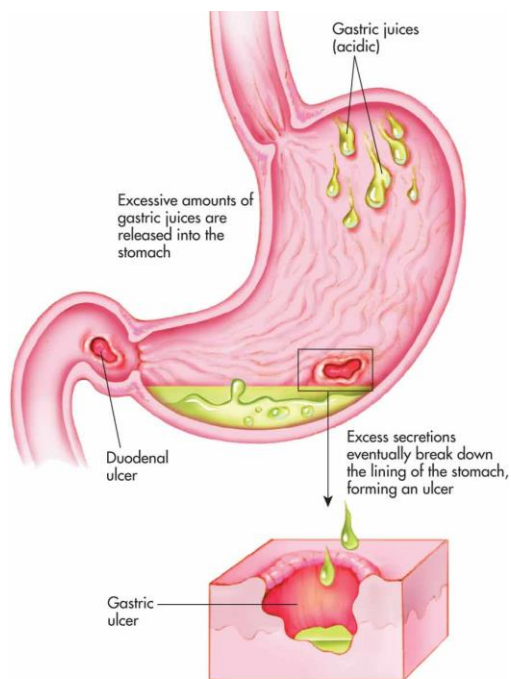


STUDY GUIDE

GASTROINTESTINAL TRACT & LIVER MODULE-I

SECOND YEAR MBBS SEMESTER 4

1st April – 17th May 2019



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LIAQUAT NATIONAL HOSPITAL
& MEDICAL COLLEGE



STUDY GUIDE FOR GASTROINTESTINAL TRACT & LIVER MODULE-I

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Module name: **Gastro-Intestinal Tract (GIT) & Liver-I**

Semester: **Four**

Year: **Two**

Duration: **6 weeks (April - May 2019)**

Timetable hours: **Interactive Lectures, Case-Based Learning (CBL), Self-Study, Practicals in Laboratory, Skills, Demonstrations**

Credit hours: **6 credit hours in theory and 3 credit hours in practical**

MODULE INTEGRATED COMMITTEE

MODULE COORDINATOR:	<ul style="list-style-type: none"> • Prof. Tabassum Zehra (Pharmacology)
CO-COORDINATORS:	<ul style="list-style-type: none"> • Prof. Nighat Huda (DHCE)

DEPARTMENTS' & RESOURCE PERSONS' FACILITATING LEARNING

BASIC HEALTH SCIENCES	CLINICAL AND ANCILLARY DEPARTMENTS
ANATOMY <ul style="list-style-type: none"> • Professor Zia-ul-Islam 	RESEARCH & SKILLS DEVELOPMENT CENTER <ul style="list-style-type: none"> • Dr Kakhshan Tahir
BIOCHEMISTRY <ul style="list-style-type: none"> • Professor Naheed Qadir 	RADIOLOGY <ul style="list-style-type: none"> • Dr. Muhammad Ayub Mansoor • Dr. Roomi Mahmud
COMMUNITY MEDICINE <ul style="list-style-type: none"> • Professor Rafiq Soomro 	
MICROBIOLOGY <ul style="list-style-type: none"> • Professor Syed Khursheed H. Hashmi 	
PATHOLOGY <ul style="list-style-type: none"> • Professor Naveen Faridi 	
PHARMACOLOGY <ul style="list-style-type: none"> • Professor Nazir Ahmad Solangi • Professor Tabassum Zehra 	
PHYSIOLOGY <ul style="list-style-type: none"> • Professor Syed Hafeezul Hassan 	
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LNH&MC MANAGEMENT	
Professor Karimullah Makki, Principal LNH&MC	
Dr. Shaheena Akbani, Director A.A & R.T LNH&MC	
STUDY GUIDE COMPILED BY: Dr. Mehnaz Umair, Department of Health Care Education	

INTRODUCTION

WHAT IS A STUDY GUIDE?

It is an aid to:

- Inform students how student learning program of the semester-wise module has been organized
- Help students organize and manage their studies throughout the module
- Guide students on assessment methods, rules and regulations

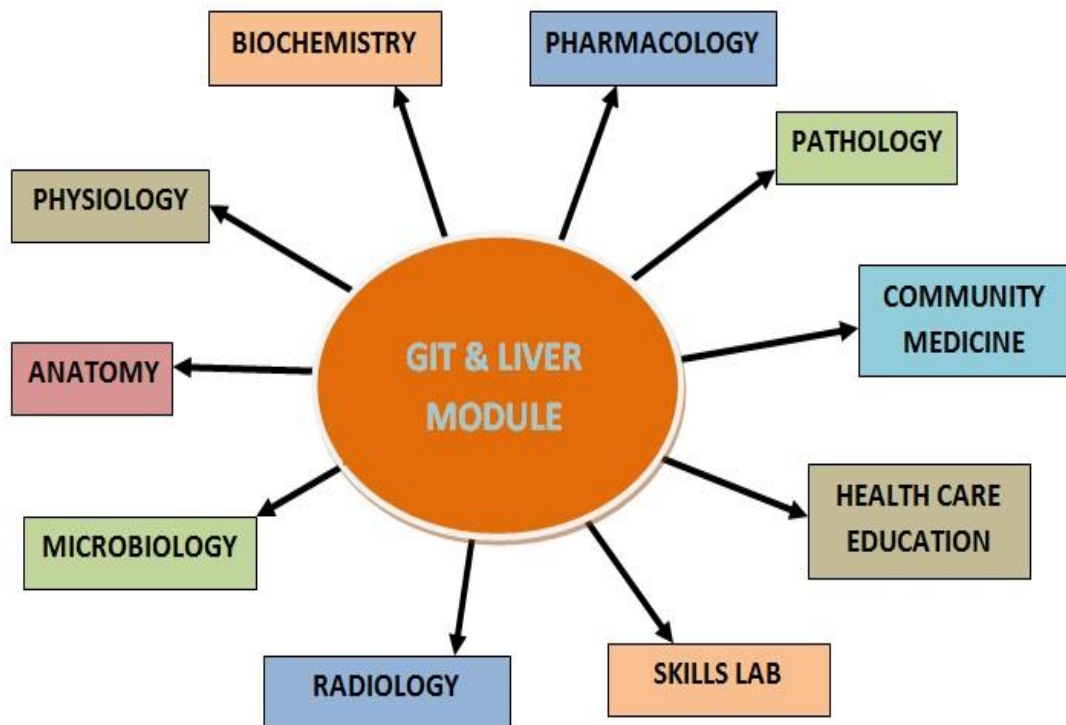
THE STUDY GUIDE:

- Communicates information on organization and management of the module.
This will help the student to contact the right person in case of any difficulty.
- Defines the objectives which are expected to be achieved at the end of the module.
- Identifies the learning strategies such as Interactive Lectures, small group teachings, clinical skills, demonstration, tutorial and case based learning that will be implemented to achieve the module objectives.
- Provides a list of learning resources such as books, computer assisted learning programs, web- links, journals, for students to consult in order to maximize their learning.
- Highlights information on the contribution of continuous and semester examinations on the student's overall performance.
- Includes information on the assessment methods that will be held to determine every student's achievement of objectives.
- Focuses on information pertaining to examination policy, rules and regulations.

CURRICULUM FRAMEWORK

Students will experience *integrated curriculum* in 4th semesters at LNMC in accordance with the JSMU guidelines and most recent developments that have an impact on individual health.

INTEGRATED CURRICULUM comprises of system-based modules such as **GIT & Liver-I**, Renal & Excretory System-I and Reproduction-I which links basic science knowledge to clinical problems. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have better understanding of basic sciences when they repeatedly learn in relation to clinical examples. Case-based discussions, computer-based assignments, early exposure to clinics, wards, and skills acquisition in skills lab and physiotherapy department are characteristics of integrated teaching program.

INTEGRATING DISCIPLINES OF GASTROINTESTINAL TRACT (GIT) & LIVER MODULE**LEARNING METHODOLOGIES**

The following teaching / learning methods are used to promote better understanding:

- Interactive Lectures
- Hospital / Clinic visits
- Small Group Discussion
- Case- Based Learning
- Practicals
- Skills session
- Self-study

INTERACTIVE LECTURES

In large group, the Interactive Lecturer introduces a topic or common clinical conditions and explains the underlying phenomena through questions, pictures, videos of patients' interviews, exercises, etc. Students are actively involved in the learning process.

HOSPITAL VISITS: In small groups, students observe patients with signs and symptoms in hospital or clinical settings. This helps students to relate knowledge of basic and clinical sciences of the relevant module.

SMALL GROUP DISCUSSION (SGD): This format helps students to clarify concepts acquire skills or attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics. Students exchange opinions and apply knowledge gained from Interactive Lectures, tutorials and self study. The facilitator role is to ask probing questions, summarize, or rephrase to help clarify concepts.

CASE- BASED LEARNING: A small group discussion format where learning is focused around a series of questions based on a clinical scenario. Students' discuss and answer the questions applying relevant knowledge gained in clinical and basic health sciences during the module.

PRACTICAL: Basic science practicals related to anatomy, biochemistry, pathology, pharmacology and physiology are scheduled for student learning.

SKILLS SESSION: Skills relevant to respective module are observed and practiced where applicable in skills laboratory or Department of Physiotherapy.

SELF STUDY: Students' assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Center, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours of self-study.

SEMESTER 4 MODULE 1: GIT & LIVER**INTRODUCTION**

In this module, medical students will learn in detail the normal structure, function and diseases of GI Tract and hepatobiliary system. From Pakistan's context, the prevalence and significance of GIT and liver illnesses can be judged from the total days that adults and children who are affected remain absent from work or schools; number of admissions to hospitals; and number of surgical procedures performed.

Children and adults present to general practice, or hospitals with signs and symptoms of some of very common illnesses related to GIT & Liver including vomiting, chronic diarrhea, constipation, peptic ulcers, enteric fever, malnutrition, jaundice etc. This module will provide students opportunities to understand the basis of these illnesses including the mechanism involved in the development of these pathologies and integrate basic medical science knowledge to clinical problem-solving.

Students will identify how GI structure (Embryology, Microscopic Anatomy and Gross Anatomy) integrates with function (physiologic mechanisms of GI motility, digestion and absorption, and liver and pancreatic function). During the module, students will acquire a wider, more generally applicable knowledge of immunology, metabolism, infectious disease and pathology related to the GI system. Therefore, the overall objective of this course is to provide an integrative understanding of the structure and functions of the gastrointestinal tract.

COURSE OBJECTIVES AND STRATEGIES

At the end of the module the students will be able to:

TOPICS & OBJECTIVES	FACULTY	LEARNING STRATEGIES
1. Introduction of GIT		
a) Classify the nutrients b) Describe effects of nutrient deficiency on health c) Explain control measures and prevention of nutrient deficiency d) Classify macro and micronutrients e) Describe the role of micronutrients in body metabolism f) List diseases caused by micronutrient deficiency g) Explain control measures and prevention of micronutrient deficiency h) Define balanced diet i) Explain energy value and bioavailability of nutrients j) Describe composition of macronutrient in balanced diet k) Calculate energy value from macronutrient	Community Medicine	Small Group Discussion
l) Discuss the abdominal quadrants with their contents and surface landmarks of the abdomen	Anatomy	Tutorial
m) Discuss the characteristics of gastrointestinal wall n) Explain functional types of movements in GIT o) Describe gastrointestinal blood flow briefly	Physiology	Interactive Lecture/Small group discussion
2. Control of GIT		
a) Describe autonomic nervous system b) Explain Myenteric and Meissner's plexus c) List GIT hormones and their role in digestive process d) Describe GIT reflexes	Physiology	Interactive Lecture/Small group discussion
3. Radiological assessment of GIT		
a) Identify various parts of normal GIT on plain X-ray	Radiology	Interactive Lecture
4. Mastication and salivary secretions		
a) Describe the mastication reflex b) Describe phases of deglutition c) Explain lower esophageal tone and motility disorders	Physiology	Practical
d) List the salivary glands e) Discuss regulation of secretion of saliva (stimuli and control)		Interactive Lecture/Small group leaning
f) Discuss the salivary composition and functions		Interactive Lecture

5. Development of foregut, midgut and hindgut & congenital anomalies			
<p>a) Explain the process of development of GIT and divisions of primitive gut</p> <p>b) Describe the derivatives of foregut , midgut & hindgut</p> <p>c) Describe the development of :</p> <ol style="list-style-type: none"> i. Esophagus ii. Stomach iii. Lesser & greater sac iv. Small and large intestine <p>d) Discuss the common congenital anomalies involving foregut:</p> <ol style="list-style-type: none"> i. esophageal atresia/stenosis ii. congenital hypertrophic pyloric stenosis iii. duodenal atresia/ stenosis iv. accessory spleen <p>e) Discuss the common congenital anomalies involving midgut & hindgut</p> <ol style="list-style-type: none"> i. congenital omphalocele ii. Gastroschisis iii. umbilical hernia iv. intestinal atresia/stenosis v. malrotationof gut vi. ileal diverticulum vii. intestinal duplication viii. Hirschsprung's disease ix. rectal atresia x. imperforate anus and anal stenosis <p>f) Describe the development of liver, biliary apparatus & pancreas and their congenital anomalies</p> <ol style="list-style-type: none"> i. extrahepatic biliary atresia ii. annular pancreas iii. accessory pancreatic tissue <p>g) Discuss the molecular regulation of Liver & Pancreas development</p>	Anatomy	Interactive Lecture/Small group discussion	
<p>h) Describe the following congenital anomalies of GIT:</p> <ol style="list-style-type: none"> i. Atresia ii. Fistulae iii. Diaphragmatic hernia iv. Omphalocele v. Gastroschisis vi. Ectopia vii. Meckel diverticulum viii. Congenital hypertrophic pyloric stenosis ix. Hirschsprung disease 	Pathology	Interactive Lecture	

6. Peritoneal cavity		
a) Explain the layers, folds, recesses and compartments of peritoneum with their clinical importance b) Discuss the extent of peritoneum, peritoneal cavity and reflections c) Explain the boundaries of greater & lesser sac	Anatomy	Interactive Lecture
7. Smooth muscles		
a) Discuss the functions of smooth muscles and their electric properties b) Explain smooth muscle contraction mechanism c) Differentiate between smooth and skeletal muscles d) Describe genesis of BER and its role in GI motility	Physiology	Interactive Lecture/Small group discussion
8. Esophagus and Stomach		
a) Demonstrate the microscopic features of esophagus and stomach b) Explain the gross anatomy of abdominal esophagus with its peritoneal & visceral relations, neurovascular supply, lymphatic drainage and clinical importance	Anatomy	Interactive Lecture/Small group discussion
c) Explain the gross anatomy of stomach with its peritoneal & visceral relations, neurovascular supply, lymphatic drainage and clinical importance		Small group discussion
d) Describe motor functions of stomach e) Explain regulation of stomach emptying f) Describe the composition, function and regulation of gastric secretions	Physiology	Interactive Lecture/Small group discussion
g) Discuss the causes and mechanism triggering vomiting	Pharmacology	Interactive Lecture
h) Discuss classification, mechanism of action, pharmacokinetics and adverse effects of antiemetic and prokinetic drugs		
i) Classify esophagitis based on etiology j) Explain esophageal obstruction, varices and achalasia	Pathology	Interactive Lecture
k) Explain the Barret esophagitis (risk factors, pathogenesis, morphology)		Small group discussion
l) Describe acute and chronic gastritis with emphasis on H. Pylori gastritis and autoimmune gastritis		Interactive Lecture
m) Define peptic ulcer n) Discuss its pathogenesis and relation to H. Pylori infection		Interactive Lecture
o) Perform abdominal examination		Skills Lab

9. Pancreas		
a) Explain the gross anatomical features of pancreas with its neurovascular supply, peritoneal relations and clinical importance	Anatomy	Small group discussion
b) Demonstrate the microscopic features of pancreas		Practical
c) Discuss the composition, function and regulation of pancreatic secretion	Physiology	Interactive Lecture/Small group discussion
d) Describe the non tumorous condition of pancreas (congenital anomalies, acute pancreatitis, non-neoplastic cysts)	Pathology	Interactive Lecture
e) Discuss the risk factors for acid peptic disease	Pharmacology	Interactive Lecture
f) Classify drugs used for treatment of acid peptic disease		
g) Discuss the mechanism of action, pharmacokinetics, therapeutic uses, adverse effects and drug interaction of H ₂ receptor antagonist		
h) Discuss the mechanism of action, pharmacokinetics, therapeutic uses, adverse effects and drug interaction of proton pump inhibitor		Interactive Lecture
i) Discuss the mechanism of action, pharmacokinetics, therapeutic uses, adverse effects and drug interaction of mucosal protective agents such as Sucralfate, colloidal Bismuth compounds and prostaglandins		Interactive Lecture
j) Explain the mechanism of action, pharmacokinetics, therapeutic uses and adverse effects of Antacids		Interactive Lecture
k) Discuss the antimicrobial drugs used in the treatment of H. Pylori infection		Interactive Lecture
10. Small and large intestine		
a) Demonstrate the microscopic features of small and large intestine	Anatomy	Practical
b) Differentiate between the parts of small and large intestine on the basis of anatomical features with neurovascular supply and lymphatic drainage		Small group discussion
c) List the clinical conditions related to small & large intestine like volvulus and intussusception		
d) List different enzymes secretions of small and large intestines	Physiology	Interactive Lecture
e) Describe regulation of different enzymes secretions of small and large intestines		
f) Describe segmentation, peristalsis, mass movement and defecation reflex		Interactive Lecture/Small group discussion
g) Describe effects of autonomic system in modulating intestinal motility		
h) Explain vomiting reflex and its causes		Small group discussion

i) Discuss malabsorption diseases (cystic fibrosis, celiac disease, environmental enteropathy, autoimmune enteropathy, lactase deficiency)	Pathology	Small group discussion
j) Discuss pathogenesis, risk factors, morphology and clinical features of celiac disease		
k) List causes of malabsorption and diarrhea		
l) Discuss the inflammatory bowel diseases		Interactive Lecture
m) Differentiate between ulcerative colitis and Crohn's disease with risk factors, pathogenesis, morphology, clinical features and diagnosis		
n) Explain irritable bowel disease	Pharmacology	Interactive Lecture/Small group discussion
o) Classify anti-diarrheal drugs with their pharmacokinetics and clinical uses		
p) List signs and symptoms of enteric fever	Community Medicine	Interactive Lecture
q) Discuss investigation and diagnosis of enteric fever		
r) Discuss role of immunization in prevention of enteric fever		
s) Describe the epidemiology and prevention of enteric/typhoid fever		
t) Discuss the clinical importance of appendix and its neurovascular supply	Anatomy	Interactive Lecture
11. Rectum & anal canal		
a) Demonstrate the microscopic features of rectum and anal canal	Anatomy	Practical
b) Discuss the structure, neurovascular supply and clinical importance of rectum		Small group discussion
c) Discuss the structure, neurovascular supply and clinical importance of anorectal junction and anal canal		Small group discussion
d) Discuss the defecation reflex and its regulation	Physiology	Interactive Lecture/Small group discussion
e) Differentiate between laxatives and purgatives based on their classification, mechanism of action, pharmacokinetics, therapeutic uses and adverse effects	Pharmacology	Interactive Lecture
12. Liver & Hepatic portal system		
a) Demonstrate the microscopic features of liver parenchyma with general concepts of hepatic lobule, portal lobule and hepatic acinus	Anatomy	Practical
b) Describe the microscopic structure of gall bladder		
c) Explain the histological features of exocrine part of pancreas	Anatomy	Small group discussion
d) Describe the gross features, neurovascular supply and clinical correlation of liver, gall bladder and extra-hepatic biliary apparatus		

e) Explain the venous drainage of organs of GIT, hepatic portal system, its tributaries and sites of porto-systemic anastomosis with its clinical importance		Interactive Lecture
f) Discuss clinical features investigations of hepatic diseases	Pathology	Interactive Lecture/Small group discussion
g) Recognize the patterns of hepatic injury, cholestasis, jaundice and portal hypertension, cirrhosis and liver failure		
h) List the causes of circulatory diseases of liver		
i) List the hepatic diseases associated with pregnancy		
j) Enumerate viral and other infectious causes of hepatitis	Microbiology	?
k) Discuss acute and chronic hepatitis, their causes, clinical features and lab values		
l) Classify Hepatitis m) Describe signs and symptoms of Hepatitis A, B, C and E n) Describe host, agent and environment of Hepatitis A,B,C and E o) Explain control measures and prevention of Hepatitis A,B,C and E p) Discuss Hepatitis control program of Pakistan	Community Medicine	Interactive Lecture
q) Discuss the clinical anatomy of spleen	Anatomy	Small group discussion
13. Gall bladder and biliary tract		
a) Describe the gross features, neurovascular supply and clinical importance of gall bladder and extra-hepatic biliary apparatus	Anatomy	Small group discussion
b) Discuss the microscopic features of gall bladder		Practical
c) Describe composition of bile and its regulation d) Explain conjugation and secretion of bile salts e) Explain role of bile acids in fats emulsification f) Describe enterohepatic circulation of bile salts	Physiology	Interactive Lecture
14. Anterior and posterior abdominal wall		
a) Describe the fascia, muscles and neurovascular supply of anterior and posterior abdominal wall	Anatomy	Small group discussion
b) Explain formation of rectus sheath with its contents		
c) Discuss the features of lumbar vertebrae		
d) Discuss the anatomical features and clinical importance of inguinal canal		
e) Differentiate between different types of abdominal and inguinal hernia		

15. Blood supply, nerve supply, lymphatics and surface anatomy of abdomen		
a) Describe the paired and unpaired branches of abdominal aorta and their supply	Anatomy	Small group discussion
b) Discuss the formation, extent, course and tributaries of Inferior vena cava		Small group discussion
c) List the branches of lumbosacral plexus supplying abdominal wall		Interactive Lecture
d) Discuss lymphatic drainage and nerves of abdomen , formation of cisterna chyli and thoracic duct		
16. Digestion & Absorption of Carbohydrates		
a) Describe dietary carbohydrates and their action	Biochemistry	Interactive Lecture
b) Explain the significance of the glycemic index		
c) Describe the importance of dietary fibers		
d) List the main digestive enzymes and describe their action on carbohydrate		
e) Discuss the abnormalities due to digestive enzyme deficiency		
f) Explain the absorption of monosaccharides by the intestinal mucosal cells		
g) Explain the significance of lactose intolerance		
h) Perform serum glucose estimation (kit method)		Practical
17. Digestion & Absorption of Proteins		
a) List the various sources of dietary protein	Biochemistry	Interactive Lecture
b) Discuss the digestion of protein in the stomach and intestine		
c) List and explain the function of the proteolytic enzymes		
d) Explain the mechanism of absorption of amino acids		
e) Discuss the biomedical importance of protein allergy, celiac sprue and cystinuria		
f) Discuss the significance of amino acid pool		
g) Explain the significance of nitrogen balance.		
18. Digestion & Absorption of Lipid		
a) List the constituents of dietary lipids	Biochemistry	Interactive Lecture
b) List causes of steatorrhea		
c) Discuss the digestion of lipid in the stomach and small intestine		
d) Explain the role of lipases in lipid digestion		

e) Discuss the digestion of dietary cholesterol and phospholipid	Biochemistry	Interactive Lecture
f) Explain the hormonal regulation of lipid digestion		
g) Discuss the absorption of lipid by the intestinal mucosal cells		
h) Discuss the resynthesize and secretion of lipid by the enterocytes		
i) Discuss the secretion of chylomicron by the enterocytes		
j) Discuss the abnormalities of lipid digestion and absorption with especial reference to cystic fibrosis		
k) Explain steatorrhea		
19. Glycolytic Pathway of Carbohydrates Metabolism		
a) Differentiate between aerobic and anaerobic glycolysis	Biochemistry	Interactive Lecture
b) Explain the role of insulin in transport of glucose inside the cells		
c) List the reactions of the two stages of glycolysis <ul style="list-style-type: none"> ○ Energy investment and ○ Energy generation 		
d) Explain the hormonal regulation of glycolysis		
e) Discuss the fate of pyruvate		
f) Explain the process of glycolysis in RBC's		
20. TCA Cycle of Carbohydrates Metabolism		
a) Discuss the significance of TCA cycle as an amphibolic pathways	Biochemistry	Interactive Lecture
b) Discuss the reactions of the TCA cycle and its regulatory steps		
c) Describe the energy produced from TCA cycle		Interactive Lecture
d) Explain the disorder of TCA cycle with special reference to PDH deficiency		
21. Metabolism of Glycogen with Its Disorders		
a) Explain the structure and function of glycogen	Biochemistry	Interactive Lecture
b) Describe the mechanism of glycogen synthesis and its regulation		
c) Describe the mechanism of glycogenolysis and its regulation		
d) Discuss the maintenance of blood glucose level		

e) Explain the various form of glycogen storage diseases		
22. Metabolic Pathway of Gluconeogenesis		
a) Describe the mechanism of gluconeogenesis	Biochemistry	Interactive Lecture
b) List the reactions which are unique to gluconeogenesis		
c) Explain the mechanism of transport of oxaloacetic acid to the cytosol		
d) Describe how gluconeogenesis is along with their regulatory enzymes		
e) Explain the Cori cycle		
23. Metabolic Pathway of HMP Shunt		
a) Describe the significance of hexose monophosphate shunt	Biochemistry	Interactive Lecture
b) Describe the oxidative and non-oxidative stages of HMP shunt		
c) Discuss the enzymes of the HMP shunt and its regulation.		
d) Explain the abnormalities of the HMP shunt especially G6PD.		
e) Discuss the significance of reactive oxygen species		
f) Discuss the functions of NADPH and glutathione		
24. Metabolic Pathway of Fructose & Galactose		
a) List the sources of fructose	Biochemistry	Interactive Lecture
b) Discuss the alternative mechanism of monosaccharide metabolism		
c) Discuss the important enzymes of fructose metabolism		
d) Explain the metabolic pathway of fructose		
e) Explain the disorders occur in fructose metabolism due to enzyme deficiencies		
f) Discuss the important enzymes of in Galactose metabolism		
g) Explain the metabolic pathway of Galactose metabolism		
h) Explain the disorders occur in Galactose metabolism due to enzyme deficiencies		
i) Describe the importance of uronic acid pathway in liver detoxification		

25. Bioenergetics & Biological Oxidation		
a) List high energy and low energy phosphate	Biochemistry	Interactive Lecture
b) List the oxido-reductase enzyme		
c) Define bioenergetics and explain the general laws of thermodynamics		
d) Define free energy and equilibrium constant		
e) Describe the coupling of endergonic and exergonic reactions by high energy intermediate (e.g. ATP)		
f) Describe the role of ATP as a energy carrier		
g) Describe biologic oxidation and redox potential		
26. Oxidative Phosphorylation & Electron Transport Chain		
a) List the ion transporters in the inner mitochondrial membranes	Biochemistry	Interactive Lecture
b) List the genetic defects of oxidative phosphorylation		
c) Explain the energy currency of the body		
d) Explain the site and mechanism of synthesis of ATP		
e) Describe the organization of the electron transport chain		
f) Discuss the functions of each complex of ETC		
g) Describe how proton are pumped from the matrix to the intermembrane space		
h) Discuss the significance of co-enzyme Q and the Q-cycle		
i) Discuss the inhibitors and uncouplers of ETC and their mechanism of action		
j) Discuss how electron transport chain releases free energy		
k) Discuss the generation of proton gradient		
l) Explain the significance of P.O. Ratio		
m) Explain Mitchell's chemiosmosis theory of electrochemical gradient		
n) Explain the glycerophosphate and malate shuttle		
27. Metabolic Role of Liver & Its Detoxification		
a) List the liver function tests based on the five main functions of the liver	Biochemistry	Interactive Lecture
b) Discuss the metabolic, synthetic, excretory, detoxification and storage functions of liver		

c) Explain the normal level of serum bilirubin (total, conjugated and unconjugated), urinary urobilinogen, urinary bilirubin, fecal stercobilinogen in different types of Jaundice	Biochemistry	Interactive Lecture
d) Discuss the importance of serum enzyme in the differential diagnosis of Jaundice (ALT, AST, ALP, LDH, GGT, and 5'-Nucleotidase)		
e) Discuss the importance of albumin, total protein and prothrombin time in diagnosing liver disease		
28. Degradation of Hemoglobin and Bilirubin Metabolism		
a) List the steps of heme degradation to bilirubin	Biochemistry	Interactive Lecture
b) Discuss the role of liver in bilirubin uptake and conjugation		
c) Discuss the secretion of bilirubin in bile		
d) Explain the fate of bilirubin in the intestine and its excretion in urine and stool		
29. Jaundice and its biochemical investigations		
a) Describe the disorders of bilirubin metabolism	Biochemistry	Interactive Lecture
b) Explain the types of bilirubin in the blood		
c) Discuss jaundice		
d) Explain the causes and diagnostic investigations of pre-hepatic Jaundice		
e) Explain the causes and diagnostic investigations of hepatocellular Jaundice		
f) Explain the causes and diagnostic investigations of post-hepatic and obstructive Jaundice		
g) Demonstrate LFTs, serum aminotransferase and serum bilirubin in lab		Practical
30. Growth assessment and malnutrition		
a) Describe the importance and uses of growth chart	Community Medicine	Interactive Lecture
b) Describe the methods of assessment of nutritional status and interpret the growth chart		
c) Define malnutrition		Interactive Lecture
d) Classify malnutrition		
e) Discuss control measures and prevention of malnutrition		
31. Medical Entomology and Parasitology		
a) Define entomology	Community Medicine	Interactive Lecture
b) Classify entomology		

c) Describe diseases caused by winged and wingless insects	Community Medicine	Interactive Lecture
d) Classify parasites		
e) Describe role of parasites in spread of disease		
f) Discuss control measures and prevention of		
g) common parasitic diseases		
32. Substance abuse and alcoholism		
a) Explain risk factors, effects and control measures for substance abuse and alcoholism	Community Medicine	Interactive Lecture
b) Discuss situation analysis of Pakistan regarding substance abuse and alcoholism		

LEARNING RESOURCES

SUBJECT	RESOURCES
ANATOMY	<p>A. <u>GROSS ANATOMY</u></p> <ol style="list-style-type: none"> 1. K.L. Moore, Clinically Oriented Anatomy 2. Neuro Anatomy by Richard Snell <p>B. <u>HISTOLOGY</u></p> <ol style="list-style-type: none"> 1. B. Young J. W. Health Wheather's Functional Histology <p>C. <u>EMBRYOLOGY</u></p> <ol style="list-style-type: none"> 1. Keith L. Moore. The Developing Human 2. Langman's Medical Embryology
BIOCHEMISTRY	<p>A. <u>TEXTBOOKS</u></p> <ol style="list-style-type: none"> 1. Harper's Illustrated Biochemistry 2. Lehninger Principle of Biochemistry 3. Biochemistry by Devlin
COMMUNITY MEDICINE	<p>A. <u>TEXT BOOKS</u></p> <ol style="list-style-type: none"> 1. Community Medicine by Parikh 2. Community Medicine by M Illyas 3. Basic <i>Statistics</i> for the Health Sciences by Jan W Kuzma
PATHOLOGY/MICROBIOLOGY	<p>A. <u>TEXT BOOKS</u></p> <ol style="list-style-type: none"> 1. Robbins & Cotran, Pathologic Basis of Disease, 9th edition. 2. Rapid Review Pathology, 4th edition by Edward F. Goljan MD <ol style="list-style-type: none"> 1. http://library.med.utah.edu/WebPath/webpath.html 2. http://www.pathologyatlas.ro/
PHARMACOLOGY	<p>A. <u>TEXT BOOKS</u></p> <ol style="list-style-type: none"> 1. Lippincot Illustrated Pharmacology 2. Basic and Clinical Pharmacology by Katzung
PHYSIOLOGY	<p>A. <u>TEXTBOOKS</u></p> <ol style="list-style-type: none"> 1. Textbook Of Medical Physiology by Guyton And Hall 2. Ganong ' S Review of Medical Physiology 3. Human Physiology by Lauralee Sherwood 4. Berne & Levy Physiology 5. Best & Taylor Physiological Basis of Medical Practice <p>B. <u>REFERENCE BOOKS</u></p> <ol style="list-style-type: none"> 1. Guyton & Hall Physiological Review 2. Essentials Of Medical Physiology by Jaypee 3. Textbook Of Medical Physiology by InduKhurana 4. Short Textbook Of Physiology by Mrthur 5. NMS Physiology

OTHER LEARNING RESOURCES

<u>Hands-on Activities/ Practical</u>	Students will be involved in Practical sessions and hands-on activities that link with the GIT & Liver-I module to enhance the learning.
<u>Labs</u>	Utilize the lab to relate the knowledge to the specimens and models available.
<u>Skills Lab</u>	A skills lab provides the simulated learning experience to learn the basic skills and procedures. This helps build the confidence to approach the
<u>Videos</u>	Video familiarize the student with the procedures and protocols to assist patients.
<u>Computer Lab/CDs/DVDs/Internet Resources:</u>	To increase the knowledge students should utilize the available internet resources and CDs/DVDs. This will be an additional advantage to increase learning.
<u>Self Learning</u>	Self Learning is scheduled to search for information to solve cases, read through different resources and discuss among the peers and with the faculty to clarify the concepts.

ASSESSMENT METHODS:**Theory:**

- **Best Choice Questions (BCQs)** also known as MCQs (Multiple Choice Questions) are used to assess objectives covered in each module.
 - A BCQ has a statement or clinical scenario followed by four options (likely answer).
 - Students after reading the statement/scenario select ONE, the most appropriate response from the given list of options.
 - **Correct answer carries one mark, and incorrect 'zero mark'. There is no negative marking.**
 - Students mark their responses on specified computer-based/OMR sheet designed for LNHMC.

OSPE/OSCE: Objective Structured Practical/Clinical Examination:

- Each student will be assessed on the same content and have same time to complete the task.
- Comprise of 12-25 stations.
- Each station may assess a variety of clinical tasks, these tasks may include history taking, physical examination, skills and application of skills and knowledge
- Stations are observed, unobserved, interactive and rest stations.
- Observed and interactive stations will be assessed by internal or external examiners.
- Unobserved will be static stations in which there may be an X-ray, Labs reports, pictures, clinical scenarios with related questions for students to answer.
- Rest station is a station where there is no task given and in this time student can organize his/her thoughts.

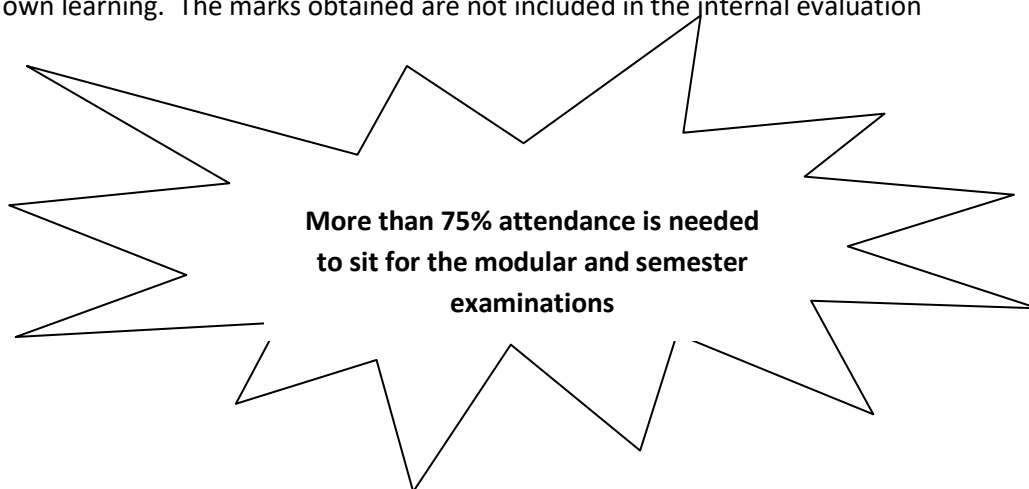
Internal Evaluation

- Students will be assessed to determine achievement of module objectives through the following:
 - **Module Examination:** will be scheduled on completion of each module. The method of examination comprises theory exam which includes BCQs and OSPE (Objective Structured Practical Examination).
 - **Graded Assessment of students by Individual Department:** Quiz, viva, practical, assignment, small group activities such as CBL, TBL, TOL, online assessment, ward activities, examination, and log book.
- Marks of both modular examination and graded assessment will constitute 20% weightage.
- As per JSMU policy, this 20% will be added by JSMU to Semester Examination.

Example : Number of Marks allocated for Semester Theory and Internal Evaluation			
Semester	Semester Examination Theory Marks	Internal Evaluation (Class test + Assignments + Modular Exam)	Total (Theory)
	80%	20%	100%

Formative Assessment

- Individual department may hold quiz or short answer questions to help students assess their own learning. The marks obtained are not included in the internal evaluation



MODULAR EXAMINATION RULES & REGULATIONS (LNH&MC)

- Student must report to examination hall/venue, 30 minutes before the exam.
- **Exam will begin sharp at the given time.**
- No student will be allowed to enter the examination hall after 15 minutes of scheduled examination time.
- Students must sit according to their roll numbers mentioned on the seats.
- **Cell phones are strictly not allowed in examination hall.**
- If any student is found with cell phone in any mode (silent, switched off or on) he/she will be not be allowed to continue their exam.
- No students will be allowed to sit in exam without University Admit Card, LNMC ID Card and Lab Coat
- Student must bring the following stationary items for the exam: Pen, Pencil, Eraser, and Sharpener.
- Indiscipline in the exam hall/venue is not acceptable. Students must not possess any written material or communicate with their fellow students.

JSMU Grading System

- It will be based on GPA – 4 system

Marks obtained in Percentage range	Numerical Grade	Alphabetical Grade
80-100	4.0	A+
75-79	4.0	A
70-74	3.7	A-
67-69	3.3	B+
63-66	3.0	B
60-62	2.7	B-
56-59	2.3	C+
50-55	2.0	C
<50 Un-grade-able	0	U

- A candidate obtaining GPA less than 2.00 (50%) is declared un-graded (fail).
- Cumulative transcript is issued at the end of clearance of **all** modules.

SCHEDULE:

WEEKS	2nd YEAR SEMESTER 4	MONTH
WEEK 1	GIT & LIVER MODULE-I	1 st April 2019
WEEK 2		
WEEK 3		
WEEK 4		
WEEK 5		
WEEK 6		14 th May 2019
	MODULAR EXAM	17 th & 18 th May 2019*
WEEK 1	REPRODUCTIVE SYSTEM MODULE-I	20 th May 2019*
WEEK 2		
WEEK 3		
WEEK 4		13 th June 2019*
	MODULAR EXAM	14 th & 15 th June 2019*
WEEK 1	RENAL & EXCRETORY SYSTEM MODULE-I	17 th June 2019*
WEEK 2		
WEEK 3		
WEEK 4		11 th July 2019*
	MODULAR EXAM	12 th & 13 th July 2019*
PREPARATORY LEAVE		