



**NUMS**  
NATIONAL UNIVERSITY  
OF MEDICAL SCIENCES



## **MBBS Year- II**

# **National University of Medical Sciences Pakistan**

## **Study Guide**

# **CMH Institute of Medical Sciences (CIMS) Bahawalpur**

## CALANDER OF 2<sup>nd</sup> YEAR MBBS CLASS (2020 / 2021)

Events	2 <sup>nd</sup> Year MBBS	Remarks
<b>Start of Session</b>	01 March 2021	
<b>1<sup>st</sup> Module</b>	14 Weeks	<b>Online Classes</b>
	01 March 2021	
	11 June 2021	
<b>2<sup>nd</sup> Module</b>	10 Weeks	<b>Lectures/ CBLs/ Prac Rotation/ Trg Time</b> Time: 0800 – 1500 Hrs Class to be divided into 2 Batches
	14 June 2021	
	20 Aug 2021	
	23 Aug to 04 Sep 2021	
<b>3<sup>rd</sup> Module</b>	07 Weeks	<b>Lectures/ CBLs/ Prac Rotation/ Trg Time</b> Time: 0800 – 1500 Hrs Class to be divided into 2 Batches
	06 Sep 2021	
	22 Oct 2021	
<b>Summer Vacations &amp; Eid ul Fitr Leave</b>	09-16 May (08 Days)	
<b>Eid ul Azha Leave</b>	17-25 July 2021 (09 Days)	
<b>Pre Send up Prep Leave</b>	23-28 Oct 2021 (06 Days)	
<b>Send up Exam</b>	29 Oct to 08 Nov 2021	Exam Cell & Respective Departments
<b>Paper Discussion</b>	09 Nov 2021	
<b>Prep Leave Annual Exam</b>	10 Nov to 06 Dec 2021 (27 Days)	
<b>Annual Exam (NUMS Schedule)</b>	07 Dec 2021	Exam Cell & Respective Departments

**WEEKLY TIME TABLE**  
**2<sup>nd</sup> YEAR MBBS CLASS**  
**(2020 / 2021)**

HOURS	1	2	3	4	5	6	7
Monday	Biochemistry	Physiology	Anatomy	Practical Batch 1, Batch 2, Batch 3 Ana, Physio & Biochem		Anatomy	Medicine
Tuesday	Biochemistry	Physiology	Anatomy	Practical Batch 1, Batch 2, Batch 3 Ana, Physio & Biochem		Anatomy	Surgery
Wednesday	Behavioral Sciences & Professionalism	Physiology	Anatomy	Practical Batch 1, Batch 2, Batch 3 Ana, Physio & Biochem		Anatomy	SDL
Thursday	Biochemistry	Physiology	Anatomy	CBL Batch 1 & Batch 2	Research Methodology & Evidence based Medicine	Anatomy	SDL
Friday	Biochemistry	Physiology	Anatomy	CBL Batch 1 & Batch 2	Anatomy	JUMMA BREAK	SDL

**KEY:**



Basic Sciences  
 Practical/ CBL: SGDs  
 Clinical Sciences



Behavioral Sciences  
 Research  
 Self-Directed learning

## TEACHING HOURS

SUBJECTS	SECOND YEAR	TOTAL
Anatomy	250	*500
Physiology	225	*450
Biochemistry	125	*250
Research Methodology & Evidence based Medicine	10	<b>*100 (at the end of final year)</b>
<b>MEDICINE</b>	25	<b>*900 (at the end of final year)</b>
General Medicine		500
Psychiatry		50
Emergency Medicine		50
Dermatology		50
Cardiology		50
Neurology		50
Pulmonology		50
Nephrology		50
Gastroenterology		50
<b>SURGERY</b>	25	<b>*900 (at the end of final year)</b>
General Surgery		600
Anesthesiology and Critical Care		50
Orthopedics and Traumatology		100
Radiology		50
Surgical Specialties: <ul style="list-style-type: none"> <li>• Urology (Compulsory)</li> <li>• Neurosurgery/ Spine Surgery/ Pediatric Surgery/ Thoracic Surgery/ Plastic Surgery/ Burn/ Vascular Surgery</li> </ul>		50 50
Behavioral Sciences & Professionalism		<b>*150 (at the end of final year)</b>
Communication Skills		
Professionalism	30	
Leadership and Management		
Medical and Islamic ethics		
Pakistan Studies	15	<b>*15</b>
Islamiyat		<b>*15</b>
Self-Directed Learning	100	<b>*500 (at the end of final year)</b>
Co-curricular activities	40	<b>*200 (at the end of final year)</b>

## INTRODUCTION

### a. Preamble

Integration has been accepted as an important educational strategy in medical education. The recently revised standards by the Pakistan Medical and Dental Council (PM&DC) encourages integration of major subjects both horizontally and longitudinally. This curriculum meets the standards of Pakistan Medical and Dental Council and our students, on completion of program will develop required competencies as defined worldwide in a graduate doctor.

MBBS Years I & II will deal with the normal structure, function and biochemical aspects of human body which is delivered in an integrated manner in clinical context. Early Clinical Exposure will be ensured by interspersed sessions throughout the curriculum, wherein the students will learn via discussing real life scenarios which they will encounter in clinical settings. This curriculum also aims to improve different skills of the future doctors including communication, leadership & management and research skills and inculcate ethical values and professionalism.

This curriculum has been developed by the faculty of basic and clinical sciences from constituent/affiliated colleges in collaboration with NUMS Academic Directorate

### b. Curriculum perspective

NUMS curriculum is evolved taking into consideration Constructivist, Cognitivist, behaviorist with some element of Constructivist approach. It allows students to construct their own knowledge based on what they already know and to use that knowledge in purposeful activities requiring decision making, problem solving, and judgments.

**c. Level of integration:** The 'complementary' approach which is both subject-based and integrated teaching will be used. The integrated sessions will represent a major feature of the curriculum

**d. Competencies** The focus of this curriculum is on the roles of a general physician as identified in the can MEDS. These are Medical Expert, Manager, Communicator, Health Advocate, Collaborator, Professional and Scholar. Competencies focused in year I and II are: -

- 1) Medical Knowledge
- 2) Problem solving
- 3) Procedural skills
- 4) Communication skills
- 5) Empathy
- 6) Professionalism
- 7) Leadership and Management skills

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

8) Research skills

**e. Outcomes**

By the end of second year, students should be able to:

- 1) Correlate the developmental and anatomical knowledge of GIT & metabolism, renal, neurosciences, Genetics, Craniocervical, Special senses, Endocrinal & Reproductive systems to their physiological, and biochemical basis.
- 2) Integrate the fundamental concepts of social and behavioural sciences with knowledge of other medical subjects
- 3) Apply the principles of research for writing research proposal
- 4) Analyze multiple perspectives of Pakistan studies

YEAR TWO						
BLOCK I 10+2=12 weeks			BLOCK II 8+2=10 weeks		BLOCK III 10+2=12 weeks:	
4 weeks	6 weeks	2w	8 weeks	2w	10 weeks	2w
GIT / Bioenergetics & Biological Oxidation	Renal	EOB	Neuroscience	EOB	Special Senses, Endocrinology & Reproduction (ENR)/ Nutrition	EOB
Carbohydrate metabolism			Molecular Medicine & Genetics			
Abdomen, Pelvis, Perineum			Brain and Spinal cord			
Behavioral Sciences, Research Methodology & Evidence based Medicine , Medicine & Allied and Surgery & Allied						

**f. Academic Calendar Year II**

SUBJECTS	SECOND YEAR
Aatomy <ul style="list-style-type: none"> <li>• Embryology</li> <li>• Histology</li> <li>• Gross Anatomy</li> </ul>	250
Physiology	225
Biochemistry	125
Research Methodology & Evidence based Medicine	10
Medicine	25
Surgery	25
Pakistan Studies	15
Behavioral Science	30
Self-Directed Learning	100
Co-curricular activities	40
<b>TOTAL HOURS</b>	<b>845</b>

**g. Proposed Contact Hours Distribution Year-II**

**h. Educational Strategies**

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

- 1) Lectures
- 2) Small group discussion
- 3) Lab practical
- 4) Skill lab
- 5) Problem based learning/ Case based learning
- 6) Tutorials

**i. Resources.** To be filled in by the institute

- 1) Faculty
- 2) Facilities
- 3) Administration for Course
- 4) Administrative structure
- 5) Communication with students

**j. Internal Assessment**

Students will be assessed at the end of each block. The weighting of internal assessment is 20% in 2nd professional MBBS Examination. There will be three end of blocks and one pre -annual examination. The scores of tests of each end block assessment and pre-annual examination will be used for calculation of the internal assessment.

**k. Annual Professional Examination.**

The University will take the first professional Examination as per PM&DC guidelines at the end of the academic year. Annual Theory & Practical Examination will be of 200 marks for Anatomy, Physiology, Biochemistry and 50 marks theory paper each of Islamiat and Pakistan Studies. The passing score is 50% in theory and practical separately.

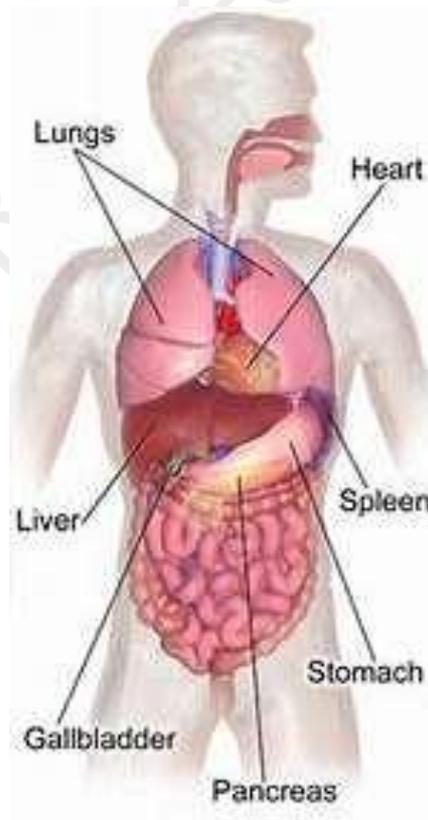
**l. Evaluation of the Course.** To be filled in by the institute

# BLOCK-I

## (10 Weeks)

Consist of following 04 Modules:

- **Gastrointestinal system**
- **Renal**
- **Abdomen, pelvis, perineum**
- **Carbohydrates metabolism**



## 1. Introduction:

This block comprises of following modules:

- a. Gastrointestinal system **(4 weeks)**
- b. Renal **(6 weeks)**
- c. Carbohydrates metabolism **(throughout the Module)**

## 2. Duration:

Total duration of the block is 12 weeks. 10 weeks are for teaching and learning and 2 weeks are for end block assessment

### a. Gastrointestinal system (4 weeks)

This module focuses on histo-morphological and embryological structure and physiological and biochemical function of gastrointestinal system along with basic understanding of structure of abdomen and role of ATP in health and disease. Learning process involves delivering the content with clinical relevance. At the very outset medical student should understand the importance of gastrointestinal system in the fields of Medicine. The research methodology, Behavioral Sciences & Professionalism will be taught as a part of the longitudinal theme.

#### **Learning Outcomes**

**At the end of this module, student will be able to:**

- Correlate the gross anatomical, developmental & light microscopic features of gastrointestinal system with their physiological functions and biochemical basis
- Apply the knowledge of gross anatomy of abdomen to understand relevant clinical scenarios
- Relate the role of ATP and energy metabolism for understanding the disease process
- Relate their relevant knowledge of this module in subsequent years of clinical training and practice
- Relate the development, macro and microscopic features, physiological and biochemical aspects of digestive tract & its associated glands with their specified clinical presentations

### b. Renal (6 weeks)

This module includes basic understanding of structure of pelvis and perineum along with histo-morphological, embryological structure and function of KUB. Learning process involves delivering the content with clinical relevance. At the very outset medical student should understand the importance of KUB in the fields of Medicine. The research methodology, Behavioral Sciences & Professionalism will be taught as a part of the longitudinal theme.

#### **Learning Outcomes**

**At the end of this module, student will be able to:**

- Recognize the normal histomorphological features of KUB and apply this knowledge in identifying common relevant histopathological in future.
- Appraise the normal development of KUB and evaluate the embryological basis of common congenital anomalies related with development of this system.
- Appraise the topographic anatomy of pelvis & perineum to deal with common clinical problems related with them.
- Correlate the gross anatomical, developmental & light microscopic features of KUB with their physiological functions and biochemical basis

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

- Relate their relevant knowledge of this module in subsequent years of clinical training and practice
- Relate the development, macro and microscopic features, physiological and biochemical aspects of renal system with its specified clinical presentations
- c. **Carbohydrates Metabolism (Throughout the block).** Carbohydrates chemistry and metabolism is very important for understanding different metabolic disorders so this topic will be taught longitudinally throughout the module wherever required. At the end of this module, student will be able to apply the biochemical knowledge of carbohydrates for understanding their related disorders

# GASTROINTESTINAL SYSTEM

Anatomy					
S.No	Topic/ Theme	Learning outcomes	Learning Objectives/Contents	MIT	Assessment tool
		By the end of this block, students should be able to:			
1.	<b>Introduction to GIT histology</b>	Appraise the light microscopic structure of different components of digestive system and	<u><b>Knowledge</b></u> <ul style="list-style-type: none"> <li>• Describe the general structural plan of alimentary canal</li> </ul>	LGIS	MCQ SEQ SAQ
2.	<b>Histology of esophagus</b>	predict functional outcomes of their altered structure.  Identify H&E stained slides of different components of digestive system and appreciate their characteristic histological features to distinguish them from common pathological conditions.	<u><b>Knowledge</b></u> <ul style="list-style-type: none"> <li>• Correlate various layers of esophagus with general structural plan of GIT</li> <li>• Differentiate between 3 parts of esophagus microscopically</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
			<u><b>Skill</b></u> <ul style="list-style-type: none"> <li>• Identify a slide of esophagus under a microscope</li> <li>• Draw a labeled diagram showing its section on the journal</li> <li>• List two points of identification</li> </ul>	Lab	OSPE SAQ Viva Voce
3.	<b>Histology of Stomach</b>		<u><b>Knowledge</b></u> <ul style="list-style-type: none"> <li>• Differentiate between a gastric gland and pit</li> <li>• Enumerate cells forming gastric glands</li> <li>• Correlate the structure and function of cells forming gastric glands</li> <li>• Compare the histological structure of cardia, fundus and pylorus of stomach on the basis of glands</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>Correlate a case of gastritis with pernicious anemia on basis of histology</li> </ul>		
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Identify a slide of stomach under light microscope</li> <li>Draw a labeled diagram showing its section (fundus and pylorus) on the journal</li> <li>List two points of identification</li> </ul>	Lab	OSPE SAQ Viva Voce
4.	<b>Histology of small intestine</b>		<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>List and justify the modifications of small intestine working as adaptive measures for carrying out its functions effectively</li> <li>List the cells forming intestinal mucosa</li> <li>Describe the light microscopic structure of duodenum, jejunum and ileum</li> <li>Tabulate the histological differences between duodenum, jejunum and ileum</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Identify the slides of duodenum, jejunum and ileum under microscope.</li> <li>List two points of identification of each.</li> <li>Draw a labeled diagram of these structures in the journal</li> </ul>	Lab	OSPE SAQ Viva Voce
5.	<b>Histology of large intestine</b>		<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Describe the histological structure of large intestine and correlate it with its functions</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce

			<ul style="list-style-type: none"> <li>Justify the increase in number of goblet cells in comparison with the absorptive cells down the tract</li> </ul>		
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Identify the slides of appendix, and colon under microscope</li> <li>List two points of identification of each</li> <li>Draw labeled diagrams showing the microscopic sections of colon and appendix in the journal</li> </ul>	Lab	OSPE SAQ Viva Voce
6.	<b>Histology of liver &amp; gall bladder</b>		<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Describe the histological structure of liver</li> <li>Illustrate the three concepts/ interpretations of liver structure/microscopic functional units (mentioning the basis/ emphasis of each concept/ interpretation)</li> <li>Describe the light microscopic structure of gallbladder</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Identify the slides of liver and gall bladder under microscope</li> <li>List two points of identification of each</li> <li>Draw labeled diagrams of liver and gall bladder in journal.</li> </ul>	Lab	OSPE SAQ Viva Voce
7.	<b>Histology of Pancreas</b>		<ul style="list-style-type: none"> <li>Describe the light microscopic structure of parenchyma, stroma and duct system of pancreas</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Identify the section of pancreas on given</li> </ul>	Lab	OSPE SAQ Viva Voce

Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards

Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards

			slides under microscope <ul style="list-style-type: none"> <li>List two points of identification.</li> <li>Draw labeled diagram of histological structure of pancreas in journal</li> </ul>		
<b>SPECIAL EMBRYOLOGY</b>					
8.	<b>Development of foregut</b>	Correlate the embryological basis of common congenital anomalies related with development of Fore, mid and hindgut	<ul style="list-style-type: none"> <li>Describe the development of primitive gut.</li> <li>List divisions of primitive gut along with their extent</li> <li>List derivatives of foregut</li> <li>Describe the development of esophagus</li> <li>Correlate the trachea-esophageal fistula, esophageal stenosis and hiatal hernia with its normal development</li> <li>Describe the development of stomach with special reference to its rotations and relocation of both vagi</li> <li>Enlist derivatives of ventral and dorsal mesentery of foregut</li> <li>Explain the formation of lesser sac</li> <li>Explain pyloric stenosis by applying the embryological knowledge.</li> <li>Describe the development of duodenum</li> <li>Describe the development of liver, biliary apparatus and spleen</li> <li>Explain the origin of pancreatic buds and correlate them with their derivatives in adult pancreas</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>• Explain Annular pancreas by applying your knowledge of normal development of pancreas.</li> <li>• Explain occurrence of accessory pancreatic tissue by applying your knowledge of normal development of pancreas.</li> </ul>		
9.	<b>Development of midgut</b>		<ul style="list-style-type: none"> <li>• Enlist derivatives of midgut</li> <li>• Describe physiological herniation with emphasis upon rationale behind its occurrence and reduction</li> <li>• Correlate the rotation of midgut loop with definitive positioning of mid gut derivatives in abdomen</li> <li>• Enlist common congenital anomalies of midgut</li> <li>• Correlate development of midgut with abnormalities of mesenteries, vitelline duct abnormalities, gut rotation defects, gut atresia &amp; stenosis</li> <li>• Differentiate between omphalocele and gastroschisis on the basis of embryology</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
10.	<b>Development of hindgut</b>		<ul style="list-style-type: none"> <li>• Enlist derivatives of hindgut</li> <li>• Define cloaca</li> <li>• Describe the partitioning of cloaca and its consequences</li> <li>• List derivatives of anorectal canal</li> <li>• Describe the development of derivatives of anorectal canal</li> <li>• Correlate the anomalies of</li> </ul>		MCQ SEQ SAQ Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			anorectal region of hindgut with normal development		
11.	<b>Development of digestive system</b>	Correlate the knowledge of development of digestive tract with three-dimensional spatial arrangement of developing structures with help of models.	<b>Skill</b> <ul style="list-style-type: none"> <li>Identify parts of developing digestive system on given models and diagrams showing different developmental phenomena</li> </ul>	SGD	OSPE Viva Voce
<b>GROSS ANATOMY OF ABDOMEN, PELVIS AND PERINEUM (To be covered during Digestive and Renal modules in the logical order)</b>					
12.	<b>Anterior abdominal wall</b>	Elucidate the gross anatomy of anterior abdominal wall to gain access to various abdominal organs & to analyze common relevant clinical problems in future training and practice	<ul style="list-style-type: none"> <li>Identify nine regions of abdominal cavity to locate the topographic arrangement of underlying abdominal organ.</li> <li>Identify the layers of anterolateral abdominal wall in the prosected specimen.</li> <li>Explain the clinical importance of membranous layer of superficial fascia with anatomical reasoning.</li> <li>Describe the origin, insertion, &amp; nerve supply of muscles of anterolateral abdominal wall and demonstrate them in the prosected specimen / model.</li> <li>Correlate the attachment of muscles of anterolateral abdominal wall with their actions</li> <li>Describe the formation of rectus sheath at different levels of abdomen and enlist its contents.</li> <li>Describe the blood supply, nerve supply &amp; lymphatic drainage</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>of anterolateral abdominal wall</p> <ul style="list-style-type: none"> <li>• Locate various surgical incisions commonly used to gain entry into the abdominal cavity</li> </ul>		
13.	<b>Inguinal Canal</b>	Apply the knowledge of Anatomy of inguinal canal in differentiating between various types of inguinal hernias	<ul style="list-style-type: none"> <li>• Describe the extent and enlist the structures forming various walls of inguinal canal in correlation with muscles and fasciae of anterior abdominal wall.</li> <li>• Locate the superficial &amp; deep inguinal rings on the surface of given subject/manikin</li> <li>• Analyze the functions &amp; mechanics of inguinal canal</li> <li>• Enlist the structures passing through the inguinal canal in males and females</li> <li>• Define hernia. Name different parts of a hernial sac.</li> <li>• Differentiate between direct &amp; indirect inguinal hernia with regards to their relation with age, predisposing factor, frequency, coverings on exit from abdominal cavity, course, &amp; exit from anterior abdominal wall</li> <li>• Define spermatic cord. Describe its extent, coverings &amp; contents</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
14.	<b>External Male genitalia</b>	Apply the anatomical knowledge of male external genitalia in identifying common clinical problems related with them	<ul style="list-style-type: none"> <li>• Explain the significance of pampiniform plexus</li> <li>• Correlate the descent of testis to its blood supply, lymphatic</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>drainage and innervations.</p> <ul style="list-style-type: none"> <li>• Define hydrocele, hematocele &amp; varicocele</li> <li>• Justify the more common occurrence of varicocele on left side of body with anatomical reasoning</li> </ul>		
15.	<b>Peritoneum</b>	Interpret the common clinical problems associated with peritoneal cavity with relevance to its gross features	<ul style="list-style-type: none"> <li>• Define peritoneum &amp; extent of its layers.</li> <li>• Enumerate intraperitoneal, extraperitoneal, &amp; secondarily retroperitoneal organs.</li> <li>• Define following with one example each: Mesentery, Omentum, Ligaments, Folds, Recesses, Pouches, Gutters</li> <li>• Trace the vertical and horizontal disposition of peritoneum and demonstrate it on the model of abdomen and pelvis.</li> <li>• Describe the role of visceral and parietal layers in peritoneal adhesions, ascites and paracentesis</li> <li>• Demonstrate the attachment of greater &amp; lesser omentum in the given model.</li> <li>• Describe the walls and recesses of omental bursa</li> <li>• Demonstrate the structures crossed by root of mesentery in the prosected specimen.</li> <li>• Demonstrate the differences in arrangement of peritoneum in males and females in the given model.</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>• Explain the role of greater omentum as abdominal policeman</li> <li>• Explain peritoneal infection &amp; basis of peritoneal pain using your knowledge of gross anatomy of peritoneum</li> </ul>		
16.	<b>Abdominal esophagus</b>	Elaborate the gross anatomy of esophagus to explain common clinical problems related with it	<ul style="list-style-type: none"> <li>• Describe abdominal esophagus regarding its relations, blood supply, nerve supply and lymphatic drainage of esophagus.</li> <li>• Explain achalasia of cardia, GERD and bleeding esophageal varices using your knowledge of gross anatomy</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
17.	<b>Stomach</b>	Elaborate the gross anatomy of stomach to explain common clinical problems related with it	<ul style="list-style-type: none"> <li>• Demonstrate the position &amp; gross features of stomach on the given model</li> <li>• Mark the stomach on the surface of given subject</li> <li>• Identify the omenta attached to stomach on a given model.</li> <li>• Enumerate the structures lying in stomach bed</li> <li>• Enumerate the structures endangered by perforating ulcer of posterior wall of stomach</li> <li>• Describe the blood supply, nerve supply and lymphatic drainage of stomach.</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
18.	<b>Small Intestine</b>	Apply the knowledge of gross Anatomy of small intestine in identifying the relevant common clinical presentations in training and practice	<ul style="list-style-type: none"> <li>• Identify the gross features of duodenum, jejunum &amp; ileum on the given model.</li> <li>• Identify the structures in relation</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

			<p>with duodenum, jejunum, &amp; ileum on the prosected specimen/model</p> <ul style="list-style-type: none"> <li>• Explain the common sites and the effects of perforation of ulcers affecting different parts of duodenum applying your knowledge of gross anatomy</li> <li>• Differentiate between gross features of jejunum and ileum in tabulated form</li> </ul>		
19.	<b>Large intestine</b>	Apply the knowledge of gross Anatomy of large intestine in appraising the relevant common clinical presentations in training and practice	<ul style="list-style-type: none"> <li>• Differentiate between small and large intestine on gross inspection</li> <li>• Explain the topographic Anatomy of large intestine with the help of a model</li> <li>• Describe the location of ileocecal valve</li> <li>• Explain the clinical importance of variable positions of appendix with anatomical reasoning.</li> <li>• Mark the McBurney point on the given model / manikin</li> <li>• Analyze the clinical presentation of a scenario of appendicitis applying your knowledge of gross anatomy</li> <li>• Define diverticulosis, volvulus, intussusception, cecostomy, &amp; colostomy</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
20.	<b>Blood supply of intestinal tract</b>	Comprehend the blood supply to the intestinal tract while ascertaining the parts prone to ischemic effects of occlusion of various blood vessels	<ul style="list-style-type: none"> <li>• Describe coeliac trunk with reference to its origin, branches and distribution</li> <li>• Describe superior mesenteric artery with reference to its</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>origin, branches and distribution</p> <ul style="list-style-type: none"> <li>• Describe inferior mesenteric artery with reference to its origin, branches and distribution</li> <li>• Correlate the parts of intestinal tract derived from fore, mid and hindgut with their blood supply from relevant arteries</li> <li>• Discuss the anatomical basis of clinical problems occurring due to occlusion of GIT blood vessels</li> </ul>		
21.	<b>Hepatic portal system</b>	Justify the clinical presentation of portal hypertension with anatomical reasoning	<ul style="list-style-type: none"> <li>• Describe the formation, significance &amp; tributaries of portal vein.</li> <li>• Describe the communications between portal &amp; systemic systems (sites of porto-systemic anastomosis) mentioning the names of veins involved.</li> <li>• Explain the role of porto-systemic anastomosis in portal hypertension</li> <li>• Analyze a case of portal hypertension with anatomical reasoning.</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
22.	<b>Liver</b>	Comprehend the gross anatomy of liver to explain common clinical problems related with it.	<ul style="list-style-type: none"> <li>• Describe the position, lobes, size, shape, coverings and ligaments of liver.</li> <li>• Mark the lobes, borders, surfaces, impressions of surrounding viscera &amp; peritoneal reflections on liver</li> <li>• Describe the dual blood supply lymph</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>drainage and nerve supply of liver</p> <ul style="list-style-type: none"> <li>• Discuss the concept of hepatic lobectomies and segmentectomy with anatomical reasons</li> </ul>		
23.	<b>Extrahepatic biliary apparatus</b>	Comprehend the gross anatomy of extrahepatic biliary apparatus to explain common clinical problems related with it.	<ul style="list-style-type: none"> <li>• Enumerate the components of Intra &amp; Extra Hepatic Biliary Systems</li> <li>• Describe the appearance, relations and blood supply of gall bladder</li> <li>• Describe the formation, course and termination of common bile duct</li> <li>• Identify the right &amp; left hepatic ducts, common hepatic duct, cystic ducts, bile duct in the given model / specimen</li> <li>• Explain the gall stones, acute cholecystitis, cholecystectomy by applying your knowledge of gross anatomy</li> <li>• Justify the referred pain of cholecystitis with anatomical reasoning</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
24.	<b>Pancreas</b>	Correlate the gross anatomy of pancreas to anatomical basis of common clinical problems related with it.	<ul style="list-style-type: none"> <li>• Identify the location, parts relations and ducts of pancreas in the given model / specimen</li> <li>• Describe the blood supply, nerve supply, lymphatic drainage of pancreas.</li> <li>• Correlate the clinical scenario of obstructive jaundice with cancer of head of pancreas &amp; bile duct.</li> <li>• Justify the referred pain of acute</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			pancreatitis with anatomical reasoning		
25.	<b>Spleen</b>	Correlate the gross anatomy of spleen to anatomical basis of common clinical problems related with it.	<ul style="list-style-type: none"> <li>Identify the gross relations of spleen on the model / specimen</li> <li>Describe location, blood supply, nerve supply &amp; lymphatic drainage of spleen,</li> <li>Justify the direction of splenomegaly with anatomical knowledge of its ligaments</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
26.	<b>Surface Anatomy</b>	Utilize the knowledge of topography of abdominal organs in plotting the same on body surface and inferring relevant clinical presentations.	<ul style="list-style-type: none"> <li>Mark transpyloric, intercostal, subcostal and midclavicular planes on the abdomen of subject/model for delineation of abdominal regions</li> <li>Mark the following on the surface of given subject: <ul style="list-style-type: none"> <li>Stomach</li> <li>Liver</li> <li>Pancreas</li> <li>Duodenum</li> <li>Spleen</li> <li>Large intestine</li> <li>McBurney's point</li> </ul> </li> </ul>	SGD	Viva Voce

PHYSIOLOGY					
S.No	Topic/ Theme	Learning Outcomes	Learning Objective/ Course Content	Instructional Strategies	Assessment Tool
1.	<b>Neural control of GIT</b>	Analyze the interplay of autonomic and enteric nervous system in GI motility	<ul style="list-style-type: none"> <li>• Appraise physiologic anatomy of gastrointestinal tract with specific focus on role of interstitial cells of <b>Cajal</b></li> <li>• Compare functions of mesenteric and myenteric plexuses</li> <li>• Link the role of autonomic nervous system in GI motility</li> </ul>	Lectures/SGD/ CBL	MCQ/ SAQ/ structured viva
2.	<b>Food Processing in oral cavity</b>	Correlate the Pathophysiology of Mastication and deglutition with specified clinical presentations	<ul style="list-style-type: none"> <li>• Recognize the role of teeth, tongue, cheeks and saliva in assimilation and digestion of food.</li> <li>• Distinguish three phases of deglutition reflex</li> <li>• Outline different types of peristalsis in esophagus are taking place</li> <li>• Relate the clinical significance of esophageal sphincter with its physiological anatomy (achalasia gastria, GERD)</li> </ul>	Lectures/SGD/ CBL	MCQ/ SAQ/ structured viva
3.	<b>Gastric functions and emptying</b>	Correlate physiological basis of gastric functions with specified clinical conditions.	<ul style="list-style-type: none"> <li>• Enumerate functions of stomach</li> <li>• Analyze endocrinal role of stomach in digestion</li> <li>• Recognize interplay of mechanical and hormonal factors in regulation of stomach emptying</li> </ul>	Lectures/SGD/ CBL	MCQ/ SAQ/ structured viva

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>• Explain the pathophysiology of gastritis, gastric atrophy, peptic ulcer and its management</li> </ul>		
4.	<b>Functions of small intestine</b>	Categorize movements and functions of each part of small intestinal in detail	<ul style="list-style-type: none"> <li>• Classify movements of small intestine</li> <li>• Elaborate neural and hormonal control of small intestinal movements</li> <li>• Summarize role of small intestine in digestion</li> </ul>	Lectures/SGD/CBL	MCQ/ SAQ/ structured viva
5.	<b>Functions of large intestine</b>	Correlate physiology of colon with specified clinical conditions	<ul style="list-style-type: none"> <li>• Categorize movements of large intestine with emphasis on haustrations</li> <li>• Enumerate functions of large intestine</li> <li>• Analyze role of secretions of large intestine in bulk movement</li> <li>• Emphasize the role of gastrocolic and duodenocolic reflexes in regulation of mass movements</li> <li>• Recognize the pathophysiological basis of diarrhea and megacolon</li> </ul>	Lectures/SGD/CBL	MCQ/ SAQ/ structured viva
6.	<b>Defecation reflex</b>	Explain the process of defecation	Compare and contrast Intrinsic and extrinsic pathways of defecation reflex	Lectures/SGD/CBL	MCQ/ SAQ/ structured viva
7.	<b>Vomiting reflex</b>	Describe mechanism (stimuli, pathways, center) and clinical significance of vomiting reflex	<ul style="list-style-type: none"> <li>• Explain the mechanism of vomiting reflex</li> <li>• Appraise the location and function of vomiting center/</li> </ul>	Lectures/SGD/CBL	MCQ/ SAQ/ structured viva

			chemoreceptor trigger zone in the brain		
9.	<b>Liver and gall bladder</b>	Relate digestive functions of liver and gall bladder with jaundice	<ul style="list-style-type: none"> <li>• Elaborate non metabolic functions of liver in detail</li> <li>• Explain role of liver in synthesis and secretion of bile</li> <li>• Explain role of gall bladder in fat digestion</li> <li>• Differentiate pathophysiology prehepatic, hepatic and pos hepatic jaundice.</li> </ul>	Lectures/SGD/CBL	MCQ/ SAQ/ structured viva

Revised (V-II)

BIOCHEMISTRY					
S.No	Topic/ Theme	Learning Outcomes	Learning Objective/ Course Content	Instructional Strategies	Assessment Tool
1.	<b>Biochemistry of Digestive Tract</b>	Relate the biochemical knowledge of Gastrointestinal secretions to relevant disorders	<ul style="list-style-type: none"> <li>Describe the composition, functions, daily secretion, stimulants and depressants of Saliva Gastric Juice, HCl Pancreatic Juice, Bile juice &amp; Succus entericus, GIT hormones (gastrin, secretin, CCK)</li> <li>Discuss the digestion and absorption of Carbohydrates, Proteins, Lipids &amp; Nucleic acids in human body</li> <li>Describe the biochemical disorders of GIT, e.g. achlorhydria, peptic ulcers, lactose intolerance, cholelithiasis and related disorders</li> </ul>	Lectures/ SGD	MCQ SAQ/SEQ
5.	<b>Bioenergetics and Biological Oxidation</b>	Justify the role of ATP and energy metabolism in health and disease	<ul style="list-style-type: none"> <li>Discuss Free energy, Free energy change, standard energy change, Endergonic and exergonic reactions and ATP</li> <li>Describe Respiratory chain, electron transport chain &amp; oxidative phosphorylation</li> <li>Describe components of respiratory chain, electron carriers, ATP synthesis coupled with electron flow &amp; phosphorylation of ADP coupled to electron transfer</li> </ul>	Lectures/ SGD	MCQ SAQ/SEQ

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>• Describe inhibitors of ETC</li> <li>• Explain the ATP-synthase, their relation to proton pump, PMF, and active transport.</li> <li>• Describe Uncouplers and inhibitors of oxidative phosphorylation</li> </ul>		
--	--	--	--	--	--

Revised (V-II)

# RENAL

## Anatomy

S.No.	Title/Theme	Learning outcomes	Learning Objectives/Contents	MIT	Assessment tool
		By the end of this block, students should be able to:			
<b>SPECIAL HISTOLOGY</b>					
1.	<b>Histology of Kidney</b>	<p>Explain the light microscopic structure of different components of urinary system and predict functional outcomes of their altered structure.</p> <p>Identify H&amp;E stained slides of different components of urinary system and appreciate their characteristic histological features to distinguish them from common pathological conditions in future.</p>	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>List parts of a uriniferous tubule and glomerulus</li> <li>Locate the different parts of uriniferous tubule in cortex and medulla of kidney topographically</li> <li>Describe the light microscopic structure of different parts of uriniferous tubule with special reference to epithelium</li> <li>Differentiate between cross section of PCT and DCT</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Identify the histological features of kidney on a slide under microscope</li> <li>Write two points of identification</li> <li>Draw a labeled diagram of identified tissue in journal</li> </ul>	Lab	OSPE SAQ Viva Voce
2.	<b>Histology of ureter and urinary bladder</b>		<p><b>Knowledge</b></p> <p>Describe the histological structure of ureter (upper and lower parts) and urinary bladder</p>	LGIS	MCQ SEQ SAQ Viva Voce
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Identify the histological features of Ureter &amp; Urinary bladder under microscope</li> <li>Write two points of identification</li> <li>Draw a labeled diagram of identified tissue on histology notebook</li> </ul>	Lab	OSPE SAQ Viva Voce
<b>SPECIAL EMBRYOLOGY</b>					
3.	<b>Development of kidneys</b>	Apply the knowledge of development of kidneys, ureter, urinary bladder and urethra in analyzing the relevant congenital anomalies	<ul style="list-style-type: none"> <li>Enlist the sources of urinary system</li> <li>Enlist three models of renal development</li> <li>Interpret the following stages of development of kidneys briefly                             <ol style="list-style-type: none"> <li>Pronephros</li> </ol> </li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce

Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards

Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards

			<ul style="list-style-type: none"> <li>b. Mesonephros</li> <li>c. Metanephros</li> <li>• Describe the development of definitive kidney with reference to the sources of different parts of uriniferous tubule, rotation and ascent of kidneys</li> <li>• Correlate following congenital anomalies with normal development <ul style="list-style-type: none"> <li>a. Horseshoe kidney</li> <li>b. Pelvic kidney</li> <li>c. Poly cystic kidneys</li> <li>d. Ectopic kidney</li> <li>e. Agenesis of kidney</li> </ul> </li> </ul>		
4.	<b>Development of ureter, urinary bladder and urethra</b>		<ul style="list-style-type: none"> <li>• Enumerate different parts and derivatives of urogenital sinus</li> <li>• Enlist the sources of ureter, urinary bladder and urethra</li> <li>• Describe the development of urinary bladder</li> <li>• Explain the relative position of ductus deferens and ureter with embryological reasoning</li> <li>• Correlate various urachal anomalies, exstrophy of bladder and exstrophy of cloaca with normal development</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
5.	<b>Development of urinary system</b>	Correlate the knowledge of development of urinary system with three-dimensional spatial arrangement of developing structures with help of models.	<p><b>Skill</b></p> <p>Identify parts of developing urinary system on given models and diagrams showing different developmental phenomena</p>	SGD	OSPE Viva Voce
<b>GROSS ANATOMY</b>					
6.	<b>Kidney and suprarenal glands</b>	Comprehend the gross anatomy of kidney to explain common clinical problems related with it.	<ul style="list-style-type: none"> <li>• Describe the gross features of kidney, relations, and its coverings</li> <li>• Draw and label the relations of anterior and posterior surfaces of both kidneys</li> <li>• Identify the impressions of surrounding structures on both kidneys in the given model.</li> <li>• Describe the blood supply, nerve supply, &amp; lymphatic drainage of kidney</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>Describe the structures involved in perinephric abscess with their anatomical relations</li> <li>Explain the anatomical basis of typical renal colic and renal transplantation</li> <li>Describe location, gross features, relations, blood supply, nerve supply, &amp; lymphatic drainage of suprarenal glands</li> <li>Explain surgical significance of renal fascia and separate compartment for suprarenal gland</li> </ul>		
7.	<b>Ureter</b>	Apply the knowledge of ureteric Anatomy in appraising the commonly occurring conditions related to it	<ul style="list-style-type: none"> <li>Describe the gross features, relations, &amp; course of both ureters on the model / specimen while mentioning its constrictions.</li> <li>Describe the blood supply and venous drainage of ureter.</li> <li>Mark the ureter on the surface of given subject</li> <li>Explain the cases of ureteric stones with anatomical reasoning.</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
8.	<b>Lumbar vertebral column and nerves of posterior abdominal wall</b>	Comprehend the basic anatomy of lumbar vertebral column and related soft nervous tissues to identify the likely source of pain and pathologic processes causing it.	<ul style="list-style-type: none"> <li>Describe the fascia of posterior abdominal wall</li> <li>Distinguish lumbar vertebrae from cervical &amp; thoracic vertebrae</li> <li>Describe anatomical features of a typical lumbar vertebra</li> <li>Explain the anatomical basis of clinical presentation of nerve root pain, herniated intervertebral discs, &amp; narrowing of spinal canal.</li> <li>Correlate the compression &amp; injury of spinal nerve to the basic anatomy of intervertebral foramina.</li> <li>Define Spondylolisthesis, lumbar spinal stenosis</li> <li>Describe the formation, relations and branches of lumbar plexus</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

			<ul style="list-style-type: none"> <li>Demonstrate the nerves of posterior abdominal wall in the given model.</li> </ul>		
9.	<b>Muscles of posterior abdominal wall</b>	Correlate the gross anatomy of posterior abdominal wall to anatomical basis of common clinical problems related with it.	<ul style="list-style-type: none"> <li>Identify the origin, insertion, nerve supply and actions of muscles of posterior abdominal wall in prosected specimen</li> <li>Describe the fascial lining of the abdominal walls</li> <li>Analyze the anatomical basis of a case of psoas abscess and its spread</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
10.	<b>Major vessels of posterior abdominal wall</b>	Analyze the presentation of clinical conditions associated with major abdominal vessels on the basis of anatomical knowledge	<ul style="list-style-type: none"> <li>Describe the extent, relations, branches and their distribution regarding abdominal aorta</li> <li>Mark the abdominal aorta in the given subject.</li> <li>Describe the obliteration of abdominal aorta &amp; iliac arteries.</li> <li>Explain formation, &amp; tributaries of inferior vena cava</li> <li>Identify the abdominal relations of inferior vena cava in the given model.</li> <li>Explain the collateral routes for abdominopelvic venous blood &amp; compression of inferior vena cava.</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
11.	<b>Lymphatic drainage of abdomen</b>	Explain the continuity of abdominal lymphatic system with that of other regions with reference to spread of malignancy.	<ul style="list-style-type: none"> <li>Name the groups of lymph nodes draining the abdomen.</li> <li>Describe the terminal group of lymph nodes around abdominal aorta</li> <li>Describe the lymphatic trunks, cisterna chili &amp; commencement of the thoracic duct.</li> <li>Differentiate between the location and area of drainage of pre and para aortic lymph nodes</li> <li>Explain the continuity of abdominal lymphatic system with other regions with reference to spread of malignancy an infection of various abdominal organs</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

12.	<b>Pelvic walls</b>	Comprehend the significant anatomy of pelvic walls in relevance to the clinical problems.	<ul style="list-style-type: none"> <li>• Demonstrate the boundaries of true and false pelvis in the given model.</li> <li>• Explain the bony landmarks &amp; sites of muscular attachments on sacrum</li> <li>• Differentiate b/w anatomical features of male &amp; female pelvis in the given model</li> <li>• Demonstrate the orientation of pelvic girdle.</li> <li>• Demonstrate the features of bony pelvis in the given model</li> <li>• Demonstrate boundaries of pelvic inlet and pelvic outlet</li> <li>• Describe the type, articulations, ligaments &amp; movements of joints of pelvis.</li> <li>• Describe anatomical basis of sacroiliac joint diseases</li> <li>• Explain anatomy of complications of pelvic fractures</li> <li>• Enumerate the structures forming pelvic diaphragm.</li> <li>• Describe the origin, insertion, nerve supply &amp; actions of muscles of pelvic walls &amp; floor</li> <li>• Explain the functional significance of pelvic floor in females</li> <li>• Analyze the clinical presentation of a case of injury to pelvic floor with anatomical reasoning</li> <li>• Demonstrate the line of attachment of pelvic peritoneum on the given model.</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce
13.	<b>Pelvic organs</b>	Analyze the anatomical basis of common clinical conditions related to various pelvic organs in both males and females	<ul style="list-style-type: none"> <li>• Describe relation, blood supply, lymphatic drainage and nerve supply of sigmoid colon</li> <li>• Describe the relations, peritoneal reflections, curvatures, blood supply, lymphatic drainage &amp; nerve supply of rectum</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

			<ul style="list-style-type: none"> <li>• Correlate blood supply of rectum with the arrangement of internal hemorrhoids</li> <li>• Identify parts and surfaces of urinary bladder on the given model</li> <li>• Describe the gross features, peritoneal covering, blood supply nerve supply and lymphatic drainage of urinary bladder</li> <li>• Differentiate between the relations of urinary bladder in models of both genders.</li> <li>• Identify the location and relations of vas deferens, seminal vesicles &amp; ejaculatory ducts on a model</li> <li>• Explain the Anatomy of prostate with reference to its surfaces, lobes, relations, blood supply, nerve supply and lymphatic drainage of prostate</li> <li>• Identify the parts of prostate most likely to be involved in benign and malignant growths of prostate</li> <li>• Justify the metastasis of carcinoma of prostate to vertebral column &amp; cranial cavity on basis of venous drainage</li> <li>• Identify the gross features of ovaries and fallopian tubes on the given model</li> <li>• Describe the blood supply, nerve supply, lymphatic drainage of ovaries and fallopian tubes</li> <li>• Correlate the anatomy of female genital tract with hysterosalpingography, ligation of uterine tubes, ectopic tubal pregnancy</li> <li>• Describe the parts, ligaments, relations and support of uterus</li> <li>• Describe blood supply, nerve supply, &amp; lymphatic drainage of uterus</li> <li>• Comprehend a case of uterine prolapse on the basis</li> </ul>		
--	--	--	--	--	--

			<p>of gross anatomy of uterus with the help of given model</p> <ul style="list-style-type: none"> <li>• Identify the relation of uterine artery and ureter in the prosected specimen &amp; explain its clinical importance.</li> <li>• Illustrate sacral plexus showing its branches</li> <li>• Enlist the branches of internal iliac artery</li> <li>• Demonstrate the main arteries &amp; veins of pelvis on the given model.</li> <li>• Enumerate different groups of lymph nodes of pelvis.</li> <li>• Explain the role of lymphatics and lymph nodes in spread of malignancies of pelvis</li> </ul>		
14.	<b>Perineum</b>	Apply the knowledge of anatomy of perineum, its parts and contents in appraising the relevant clinical scenarios in both males and females	<ul style="list-style-type: none"> <li>• Define perineum. Identify its borders, relations &amp; divisions in the given model.</li> <li>• Explain the boundaries of superficial and deep perineal pouches and enumerate their contents in both genders</li> <li>• Illustrate the cutaneous nerves of the perineum.</li> <li>• Define perineal body. Enlist structures attached with it. Justify its clinical importance</li> <li>• Describe the relations, internal features, blood supply, lymphatic drainage, &amp; innervations of anal canal</li> <li>• Compare the gross features and presentation of external &amp; internal hemorrhoids</li> <li>• Elucidate perianal hematoma, fissure, abscess and fistulas of anal canal with anatomical basis of their occurrence and presentation</li> <li>• Describe the boundaries, contents &amp; recesses of ischiorectal fossa</li> <li>• Justify the possible routes of spread of ischiorectal abscess with anatomical reasoning</li> <li>• Explain area of anesthesia, indications, &amp; enlist steps of pudendal nerve block</li> </ul>	SGD	MCQ SEQ SAQ OSPE Viva Voce

			<ul style="list-style-type: none"> <li>Describe the gross features of vagina including relations, blood supply, nerve supply &amp; supports</li> <li>Apply the anatomical knowledge in analyzing a case of vaginal prolapse</li> <li>Enlist the structures pierced during culdocentesis.</li> <li>Explain gross features of all parts of male &amp; female urethra, its arterial, venous drainage &amp; nerve supply</li> <li>Apply anatomical reasoning in justifying the route of extravasation of urine in case of injury to different parts of male urethra</li> <li>Enlist parts of female external genitalia and describe their blood and nerve supply</li> </ul>		
15.	<b>Surface Anatomy</b>	Utilize the knowledge of topography of contents of posterior abdominal wall in plotting the same on body surface and inferring relevant clinical presentations.	<ul style="list-style-type: none"> <li>Mark the following on the surface of given subject: <ul style="list-style-type: none"> <li>Kidneys</li> <li>Suprarenal glands</li> <li>Ureter</li> <li>Abdominal aorta</li> <li>Inferior vena cava</li> </ul> </li> </ul>	SGD	Viva Voce

#### LIST OF PRACTICALS:

S.No.	Practicals
Identify and illustrate the following slides:	
1	Esophagus
2	Stomach
3	Small Intestine
4	Colon and Appendix
5	Liver and Gall bladder
6	Pancreas
7	Kidney
8	Ureter & urinary bladder

**LEARNING RESOURCES:**

- a. Clinical Anatomy for Medical Students by Richard Snell (9th edition).
- b. Basic Histology Text and Atlas by Luiz Carlos and Junqueira (14th edition)
- c. Basic Histology by Laiq Hussain Siddiqui (5<sup>th</sup> Revised edition)
- d. Medical Embryology by Langman (14th edition).
- e. Essential Clinical Anatomy by Keith Moore (7th edition).
- f. The Developing Human by Keith Moore (10th edition).

Revised (V-II)

PHYSIOLOGY					
S.No	Topic/ Theme	Learning Outcomes	Learning Objective/ Course Content	Instructional Strategies	Assessment Tool
1.	Water balance	Relate pathophysiological basis of water balance in the body with its clinical implications (dehydration, vomiting, hemorrhage, SIADH)	<ul style="list-style-type: none"> <li>Identify distribution of total body water and ions in different body compartments</li> <li>Appraise the basic principles of osmosis and osmotic pressure</li> <li>Explain the effect of tonicity of solutions on cell physiology</li> <li>Analyze Indicator dilution method</li> </ul>	Lectures/SGD /CBL	MCQ/SAQ/structure dviva
2.	Edema	Elucidate edema types, clinical significance and factors responsible for causing edema	<ul style="list-style-type: none"> <li>Analyze the role of Starling forces and other safety factors (lymphatics, negative ISF pressure) in prevention of edema.</li> <li>Differentiate between pitting and nonpitting edema based on its etiology, pathophysiology and clinical significance.</li> </ul>	Lectures/SGD /CBL	MCQ/SAQ/structure dviva
3.	Functional anatomy of kidney	Recognize functions of kidneys.	<ul style="list-style-type: none"> <li>Outline the physiological anatomy of nephron and glomerular capillary membrane</li> <li>List primary and endocrinal functions of kidney</li> </ul>	Lectures/SGD /CBL	MCQ/SAQ/structure dviva

4.	Urine formation	Analyze the process of urine formation, concentration and dilution.	<ul style="list-style-type: none"> <li>• Relate the determinants of GFR to clinical conditions.</li> <li>• Identify the parameters involved</li> </ul>	Lectures/SGD /CBL	MCQ/SAQ/structure dviva
----	-----------------	---	--	-------------------	-------------------------

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>in autoregulation of GFR and blood flow.</p> <ul style="list-style-type: none"> <li>• Distinguish role of different parts of nephron and key electrolytes (Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>+</sup> and PO<sub>4</sub>) in tubular reabsorption and secretion keeping in view the role of Glomerulotubular mechanism of reabsorption.</li> <li>• Explain factors regulating urine concentration</li> <li>• Appraise the role of vasa recta in maintaining hyperosmolarity of renal medulla</li> <li>• Recognize the role of ADH in urine dilution</li> </ul>		
5.	Plasma clearance	Correlate plasma clearance methods to quantify kidney functions	<ul style="list-style-type: none"> <li>• Recognize the importance of estimation of GFR by inulin and creatinine clearance</li> <li>• Identify the importance of PAH for estimation of renal plasma flow.</li> </ul>	Lectures/SGD /CBL	MCQ/SAQ/structure dviva

6.	Renin angiotensin aldosterone system	Explain regulation of BP	<ul style="list-style-type: none"> <li>• Analyze the role of renin angiotensin and aldosterone system in natriuresis and diuresis</li> <li>• Explain long term control of BP</li> <li>• Identify therapeutic role of diuretics and ACE inhibitors,</li> </ul>	Lectures/SGD /CBL	MCQ/SAQ/structure diva
----	---	--------------------------	---	----------------------	---------------------------

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			Angiotensin-2 antagonists in regulation of BP		
7.	Micturition reflex	Analyze the mechanical and Neural control of micturition process.	<ul style="list-style-type: none"> <li>Outline physiologic anatomy of urinary bladder</li> <li>Correlate normal micturition reflex with its clinical abnormalities (atonic, automatic and neurogenic bladder)</li> </ul>	Lectures/SGD /CBL	Mcq/SAQ/structure viva
8.	Acid base balance	Diagnose acid base disorders on clinical scenarios and arterial blood gas analysis	<ul style="list-style-type: none"> <li>Revisit reabsorption of H<sup>+</sup> and HCO<sub>3</sub><sup>-</sup> in kidneys and other body buffers</li> <li>Analyze Interplay of respiratory and renal systems in regulation of acid base balance</li> <li>Interpret arterial blood gas analysis in various acid base disorders</li> </ul>	Lectures/SGD /CBL	Mcq/SAQ/structure viva

**LIST OF PRACTICALS PHYSIOLOGY**  
**Block I, Year II**

1	Calculate BMI & Waist Circumference on SP and determine the Mean, Mode and Median for the batch
2	Examine abdomen on SP following correct sequence of inspection, palpation, percussion and auscultation
3	Interpret metabolic acidosis and alkalosis on an Arterial Blood Gases report
4	Measure the blood glucose levels using the glucometer
5	Estimate urine specific gravity on a given sample

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

BIOCHEMISTRY				
Topic/ Theme	Learning Outcomes	Learning Objective/ Course Content	Instructional Strategies	Assessment Tool
<b>Body Fluids + Water &amp; Electrolyte, Acid Base Balance</b>	Appraise the impact of water, electrolyte and acid base imbalances on human health	<ul style="list-style-type: none"> <li>➤ Discuss biochemistry of water, fluid haemostasis, electrolyte balance and acid base haemostasis</li> <li>➤ Comprehend Acid base disorders and blood pressure</li> <li>➤ Describe Ionization of water &amp; weak acids, bases, pH pK values, pH scale, Dissociation constant &amp; titration curve of weak acids</li> <li>➤ Apply Henderson-Hasselbalch Equation</li> <li>➤ Explain the mechanism of Buffering and pH homeostasis</li> <li>➤ Enumerate various types of particles and solutions in relation to the importance of selectively permeable membranes</li> <li>➤ Describe the importance of selectively permeable membranes, osmosis, osmotic pressure, surface tension, viscosity &amp; their importance related to body fluids</li> <li>➤ Explain the Distribution of body water in</li> </ul>	<ul style="list-style-type: none"> <li>• LECTURES</li> <li>• PBL</li> <li>• CBL</li> <li>• SGD</li> </ul>	MCQ/ SAQ/SEQ

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		<p>various compartments</p> <ul style="list-style-type: none"> <li>➤ Enlist different functions of water in human body</li> <li>➤ Explain Regulation of water balance in body.</li> <li>➤ Describe the role of buffer system, lungs &amp; kidney in PH maintenance in human body</li> <li>➤ Explain clinical conditions of Hyper and hyponatremia, hypo/hyperkalemia and hypo/hyper magnesemia</li> <li>➤ Discuss various Disorders of acid base balance</li> <li>➤ Describe Anion Gap and its clinical significance.</li> </ul>		
<b>Practical</b>	Interpret the results of specific gravity of urine	Physical Examination of Urine	Practical	OSPE
	Justify the use of different solutions in clinical practice	Types of Solutions, their preparation and clinical significance		
	Demonstrate the working and application of pH metery	The techniques and instrumentation of pH metery		
		<b>Urine report</b>		

# CARBOHYDRATES METABOLISM

S.No.	Topic/ Theme	Learning outcomes	Learning Objectives/ Content	Instructional strategies
<b>Carbohydrate Chemistry</b>	Relate the significance of different carbohydrates in medicine	<ul style="list-style-type: none"> <li>➤ Classify Carbohydrates and explain their Biochemical functions</li> <li>➤ Discuss the structure and functions of Monosaccharides and enumerate their various derivatives</li> <li>➤ Explain the structure and functions of Disaccharides with examples</li> <li>➤ Describe Oligosaccharides and their combination with other macromolecules</li> <li>➤ Enumerate important examples of Polysaccharides and give their biochemical role</li> </ul>	Lectures/ SGD	MCQ SAQ/SEQ
<b>Metabolism of Carbohydrates</b>	Apply the knowledge of carbohydrate metabolism for understanding relevant metabolic disorders	<ul style="list-style-type: none"> <li>➤ Outline the Phases reactions of Glycolysis and regulation of Glycolysis</li> <li>➤ Describe the bioenergetics of Aerobic and Anaerobic glycolysis and their biochemical importance</li> <li>➤ Discuss fate of Lactic acid &amp; Pyruvate</li> <li>➤ Draw Cori's cycle</li> <li>➤ Outline the Citric Acid Cycle-Reactions</li> <li>➤ Describe the energetics, regulation, importance and amphibolic nature of citric acid cycle.</li> <li>➤ Discuss Gluconeogenesis &amp; state the three important bypass reaction &amp; significance of gluconeogenesis</li> </ul>	Lectures/ SGD	MCQ SAQ/SEQ

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		<ul style="list-style-type: none"> <li>➤ Compare and contrast Glycolysis &amp; gluconeogenesis</li> <li>➤ Discuss the Glycogen Metabolism &amp; Write down the reactions of Glycogenesis and glycogenolysis.</li> <li>➤ Outline the importance of UDP-Glucose &amp; regulation of Glycogen metabolism</li> <li>➤ Describe the disorders of Glycogen metabolism (Glycogen Storage Diseases)</li> <li>➤ Compare and contrast Glycogenesis and glycogenolysis</li> <li>➤ Describe Hexose Mono Phosphate Shunt, its reactions and importance</li> <li>➤ Explain Glucuronic acid pathway, its reactions and importance</li> <li>➤ Describe the metabolism of Fructose, Galactose and Lactose</li> </ul>		
<b>Practicals</b>	Perform and interpret the results	<ul style="list-style-type: none"> <li>➤ Estimation and clinical interpretation of Glucose in blood</li> <li>➤ Estimation and clinical interpretation of plasma enzyme Amylase</li> <li>➤ Experiments on Carbohydrates qualitative analysis-I</li> <li>➤ Molisch test</li> <li>➤ Experiments on Carbohydrates qualitative analysis-II</li> <li>➤ Benedicts test</li> <li>➤ Fehlings test</li> <li>➤ Experiments on Carbohydrates qualitative analysis-III</li> <li>➤ Iodine test</li> <li>➤ Seliwanoff test</li> </ul>	Practical	OSPE

Medicine					
Block I (2 <sup>nd</sup> Year)		GIT (04 Weeks) Renal (06 Week)			
S.No.	Topic/ Theme	Learning outcomes	Learning Objectives/ Content	Instructional strategies	Assessment tool
1.	<b>Cirrhosis liver</b>	Correlate the anatomical knowledge of liver and portal system with relevant clinical presentations	<ul style="list-style-type: none"> <li>Enumerate the causes of liver cirrhosis and portal hypertension</li> <li>Explain the rationale behind clinical features of cirrhosis with special emphasis on Porto systemic anastomosis</li> <li>Justify the clinical presentation of portal hypertension with anatomical reasoning</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
2.	<b>Peptic Ulcer</b>	Correlate the relevant basic knowledge with clinical presentations	<ul style="list-style-type: none"> <li>Enumerate the causes of peptic ulcer</li> <li>Justify the clinical presentation of peptic ulcer with reasoning</li> </ul>		
3.	<b>Lactose Intolerance</b>		<ul style="list-style-type: none"> <li>Demonstrate understanding of basic concepts</li> <li>Justify the clinical presentation with reasoning</li> </ul>		
4.	<b>Malabsorption Syndromes</b>				
5.	<b>Acute &amp; chronic Renal Failure</b>				
6.	<b>Nephrotic Syndrome</b>				
7.	<b>Acid Base Disorders</b>				
9.	<b>Micturition Reflex Abnormalities</b>				
10.	<b>Diuretics</b>				

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

Surgery					
S.No	Topics	Learning Outcomes	Learning objectives	MIT	Assessment tool
		By the end of session, student should be able to:			
1.	<b>Abdominal Incisions</b>	Apply the anatomical knowledge in deciding about the preferred route of approaching abdominal cavity in different scenarios in practice	<ul style="list-style-type: none"> <li>• Demonstrate abdominal wall quadrants on a simulated patient</li> <li>• List common abdominal wall incisions and their indications List advantages and disadvantages of common abdominal wall incisions</li> <li>• Enlist the structures encountered sequentially by penetrating the abdominal wall just medial to, in front of, and lateral to the rectus sheath</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
2.	<b>Abdominal hernias</b>	Correlate the anatomical knowledge of abdominal wall in differentiating between various types of abdominal hernias	<ul style="list-style-type: none"> <li>• Define hernia</li> <li>• Describe various parts of hernia</li> <li>• Enumerate different types of hernia Differentiate between clinical presentation of direct and indirect inguinal hernia</li> <li>• Differentiate between clinical presentation of inguinal and femoral hernia</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
3.	<b>Cholecystitis and cholelithiasis</b>	Apply the anatomical	<ul style="list-style-type: none"> <li>• Define Cholecystitis and cholelithiasis</li> </ul>	LGIS	MCQ SEQ

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		knowledge in formulating the differential diagnosis of abdominal pain	<ul style="list-style-type: none"> <li>Discuss the typical clinical presentation of cholecystitis and cholelithiasis</li> <li>Explain the referred pain of biliary colic with anatomical reasoning</li> </ul>		SAQ Viva Voce
4.	<b>Acute appendicitis and diverticulitis</b>		<ul style="list-style-type: none"> <li>Define acute appendicitis</li> <li>Define diverticulitis</li> <li>Describe embryological basis of diverticulitis</li> <li>List complications of acute appendicitis</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
5.	<b>Ureteric colic</b>		<ul style="list-style-type: none"> <li>Identify the typical clinical presentation of urological colic</li> <li>List risk factors for the most common types of kidney stones</li> <li>Explain the rationale behind referred pain of ureteric colic</li> <li>List common sites of impaction of renal stone</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
<b>GYNECOLOGY AND OBSTETRICS</b>					
6.	<b>Pelvic diameters with clinical significance</b>	Correlate the anatomical knowledge of bony pelvis with procedure of pelvic assessment	<ul style="list-style-type: none"> <li>Describe anatomy of bony pelvis</li> <li>Differentiate between different types of pelvis</li> <li>Describe the features of pelvic inlet and outlet</li> <li>Relate fetal head diameters with bony pelvis</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>Outline landmarks for assessment of female pelvis</li> </ul>		
7	<b>Prolapse of uterus and uterine support</b>	Analyze the anatomical basis of a case of uterine prolapse	<ul style="list-style-type: none"> <li>Recall the anatomic components and relationships of the pelvic organs.</li> <li>Describe the anatomy of supporting ligaments and fascia of the female pelvic organ</li> <li>Describe the normal position of uterus Enlist the structures that could prolapse and cause a bulge in anterior and posterior walls of uterus in cases of cystocele and rectocele respectively</li> <li>Correlate anatomical prolapse with functional symptoms including urinary, bowel and sexual dysfunction.</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
<b>RADIOLOGY</b>					
8	<b>Imaging of Abdomen and pelvis</b>	Correlate the anatomical knowledge of abdomen, pelvis and perineum with relevant radiological presentation	<ul style="list-style-type: none"> <li>Identify important bony land marks on plain X ray abdomen and pelvis</li> <li>Identify gas under diaphragm and multiple air fluid levels on radiographs</li> </ul>	LGIS	<ul style="list-style-type: none"> <li>MCQ</li> <li>OSPE</li> <li>Viva Voce</li> </ul>

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

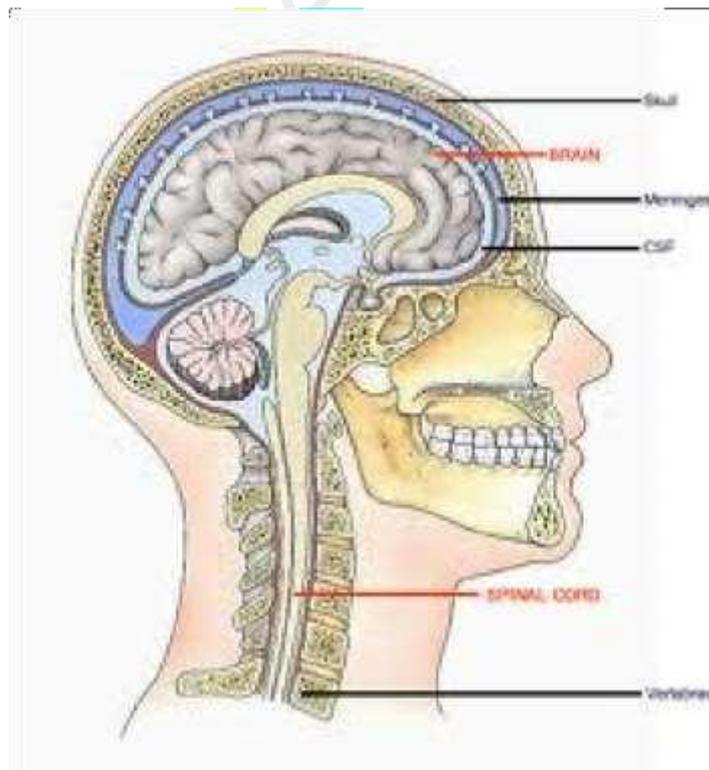
*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>• Identify normal appearance of GIT on plain radiographs and after barium meal and barium enema</li> <li>• Differentiate between normal and abnormal esophageal contrast study</li> <li>• Identify different parts of urinary tract on IVP</li> <li>• Identify normal appearance of viscera of pelvis on radiographs</li> </ul>		
--	--	--	--	--	--

<b>Research Methodology</b>					
<b>S.No</b>	<b>Topic/ Theme</b>	<b>Learning Outcomes</b>	<b>Learning Objectives/Contents</b>	<b>Instructional strategies</b>	<b>Assessment Tool</b>
<b>1.</b>	<b>Quantitative and qualitative research</b>	Differentiate quantitative and qualitative research methodology and its applications.	Quantitative research and its applications Qualitative research methodology	LGIS/ SGD	MCQ/ SEQ
<b>2.</b>	<b>Study designs</b>	Classify study designs with relation to hierarchy of evidence	Observational study Cross-sectional study Case-control study Interventional study	LGIS/ Group assignment	MCQ/ SEQ
<b>3.</b>	<b>Study population and its selection</b>	Able to select study population and sample as per defined criteria	Population Sample Inclusion and exclusion criteria for selection of patients	LGIS/ SGD	MCQ/ SEQ

# BLOCK-II

- Neuroscience
- Brain & Spinal Cord
- Molecular Medicine & Genetics



*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

### 1. Introduction:

This block comprises of following modules:

- a. Neuroscience/ Brain & Spinal Cord/ Molecular Medicine & Genetics

### 2. Duration:

Total duration of the block is 10 weeks. 8 weeks are for teaching and learning and 2 weeks are for end block assessment

### 3. Preamble

This module provides an insight to histo-morphological and embryological structure and function of Central Nervous system. It also focuses on biochemical basis of nucleotide, molecular medicine and Genetics, Xenobiotics, cancer & aging and antioxidants & free radicals. Learning process involves delivering the content with clinical relevance. This module allows medical student to understand the importance of Central Nervous System in the fields of Medicine.

The Research Methodology, Behavioral Sciences & Professionalism will be taught as a part of the longitudinal theme.

#### Learning Outcomes

**At the end of this module, student will be able to:**

- Correlate the gross anatomical, developmental & light microscopic features of Nervous System with their functions to apply this knowledge in relevant clinical scenarios encountered in subsequent years of training and practice.
- Correlate the developmental and light microscopic features of reproductive system with their functions and apply this knowledge in relevant clinical conditions encountered in subsequent years of training and practice.
- Relate the basic knowledge of nucleotide metabolism, Molecular medicine and Genetics, Xenobiotics, Cancer & aging and Antioxidants & free radicals with their clinical significance
- Apply their relevant knowledge of this module in subsequent years of clinical training and practice
- Explain the physiological mechanisms controlling the functions of Central Nervous System in relationship with sensory, motor and autonomic nervous system.

ANATOMY					
S.No.	Topic/ Theme	Learning outcomes	Learning Objective/ Content	Instructional strategies	Assessment tool
1.	<b>Histology of nervous tissue</b>	1. Correlate the light micro-structure of different components of nervous system with their	<ul style="list-style-type: none"><li>• Enlist the components of nervous tissue.</li><li>• Summarize the histological features and functions of neuron and neuroglia.</li></ul>	LGIS/ Practical	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		<p>functions and predict functional outcomes of their altered structure.</p> <p>2. Differentiate between H&amp;E stained slides of different components of nervous system, and appreciate their characteristic histological features to predict functional outcomes that result from their altered structure and function.</p>	<ul style="list-style-type: none"> <li>Classify neurons according to their morphology and functions with one example of each.</li> <li>Define neuroglia and enlist its main types.</li> <li>Explain the myelinated and unmyelinated nerve fibers of central and peripheral nervous system</li> <li>Explain the histomorphological composition of peripheral nerve.</li> <li>Define ganglia. Differentiate between sensory and autonomic ganglia in tabulated form.</li> <li>Apply knowledge of histology to explain the clinical scenarios related to multiple sclerosis, Alzheimer disease, Parkinson disease and neuron injuries.</li> <li>Describe the histological features of white and grey matter of spinal cord.</li> <li>Enumerate layers of cerebral and cerebellar cortices and enlist different cell types of these layers.</li> </ul> <p>Identify &amp; illustrate histological features of peripheral nerve, ganglia, spinal cord, cerebrum and cerebellum under light microscope and enlist two points of identification for each.</p>		
2.	<b>Histology of male</b>	<ul style="list-style-type: none"> <li>Relate the light micro-structure of different</li> </ul>	<ul style="list-style-type: none"> <li>Correlate the histomorphological features of testes and</li> </ul>	LGIS/ Practical	MCQs/ SEQs/ SAQs/

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

	<b>reproductive system</b>	<p>components of male reproductive system with their functions and predict functional outcomes of their altered structure.</p> <ul style="list-style-type: none"> <li>• Differentiate between H&amp;E stained slides of different components of male reproductive system and appreciate their characteristic histological features to predict functional outcomes that result from their altered structure and function.</li> </ul>	<p>blood-testes barrier with their functions.</p> <ul style="list-style-type: none"> <li>• Explain the histomorphological features of male genital ducts.</li> <li>• Explain the histomorphological features of accessory glands of the male reproductive system and penis.</li> <li>• Apply the knowledge of histology to explain the clinical scenarios regarding the following conditions. <ul style="list-style-type: none"> <li>○ Immotile cilia syndrome</li> <li>○ Benign prostatic hypertrophy</li> <li>○ Carcinoma of prostate</li> </ul> </li> <li>• Identify, differentiate and illustrate the light microscopic structure of following components of male reproductive system: <ul style="list-style-type: none"> <li>○ Testis</li> <li>○ Epididymis</li> <li>○ Vas deferens</li> <li>○ Seminal vesicle</li> </ul> </li> </ul>		OSPE/ VIVA VOCE
3.	<b>Histology of female reproductive system</b>		<ul style="list-style-type: none"> <li>• Describe the histomorphological features of following female reproductive organs <ul style="list-style-type: none"> <li>○ Ovaries</li> <li>○ Fallopian tubes</li> <li>○ Uterus</li> <li>○ Cervix</li> <li>○ Vagina</li> </ul> </li> </ul>	LGIS	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

			<ul style="list-style-type: none"> <li>• Apply the knowledge of histology to explain the clinical scenarios regarding the following conditions. <ul style="list-style-type: none"> <li>○ Endometriosis</li> <li>○ Cervical carcinoma</li> </ul> </li> <li>• Identify, differentiate and illustrate following components of female reproductive system. <ul style="list-style-type: none"> <li>○ Ovary</li> <li>○ Fallopian tube</li> <li>○ Uterus</li> <li>○ Vagina</li> </ul> </li> </ul>		
4.	<b>Development of central nervous system and skull</b>	Comprehend the embryological basis behind formation of different components of nervous system and correlate them with various relevant clinical presentations.	<ul style="list-style-type: none"> <li>• Describe the development of neural tube with reference to neurulation, vesicles, brain flexures and ventricles.</li> <li>• Describe the development and positional changes of spinal cord.</li> <li>• Describe the formation and developmental changes in alar and basal plates.</li> <li>• Comprehend the embryological basis of various types of Spina bifida.</li> <li>• Enumerate the derivatives of rhombencephalon, mesencephalon and prosencephalon.</li> <li>• Compile the organization of Alar and Basal plate neurons in brain stem with reference to their type, type of innervation, cranial nerve and location.</li> <li>• Describe the development of the following</li> </ul>	LGIS	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

			<ul style="list-style-type: none"> <li>○ Medulla oblongata</li> <li>○ Midbrain</li> <li>○ Pons</li> <li>○ Cerebellum</li> <li>○ Pituitary gland</li> <li>○ Supra renal gland</li> <li>● Apply the knowledge of embryology to explain the clinical scenarios regarding: <ul style="list-style-type: none"> <li>○ Holoprosencephaly</li> <li>○ Schizencephaly</li> <li>○ Exencephaly</li> <li>○ Hydrocephaly</li> <li>○ Microcephaly</li> </ul> </li> <li>● Tabulate the cranial nerves with their composition (brain region, type and innervation).</li> <li>● Summarize in a tabulated form the contribution of neural crest cells and placodes to ganglia of the cranial nerves</li> <li>● Demonstrate different parts of brain and spinal cord on the given model.</li> <li>● Explain development of viscerocranium</li> <li>● Describe the stages of differentiation of neurocranium into membranous neurocranium and chondrocranium.</li> <li>● Describe the importance of fontanelle of skull in new born with reference to: <ul style="list-style-type: none"> <li>○ Normal ossification of the skull</li> <li>○ Changes in intracranial pressure</li> <li>○ Newborn Cranium.</li> </ul> </li> </ul>		
--	--	--	--	--	--

			<ul style="list-style-type: none"> <li>○ Closure of different fontanelle</li> <li>● Explain the embryological basis of cranioschisis and craniosynostosis</li> <li>● Enlist different types of skeletal dysplasia's and explain achondroplasia and hypochondroplasia.</li> </ul>		
5.	<b>Development of reproductive system</b>	Comprehend the embryological basis behind formation of different components of male/female reproductive systems and correlate them with various relevant clinical presentations.	<ul style="list-style-type: none"> <li>● Explain the indifferent stage of gonad development.</li> <li>● Explain the development and descent of testis.</li> <li>● Describe the embryological basis of cryptorchidism</li> <li>● Summarize the development of ovaries</li> <li>● Describe the indifferent stage of genital ducts development.</li> <li>● Explain the development of genital ducts in the male and female.</li> <li>● Describe the indifferent stage of external genitalia development.</li> <li>● Explain the development of external genitalia in the male and female.</li> <li>● Describe the differentiation of male and female external genitalia from genital swellings</li> <li>● Enlist common anomalies of the male genitalia.</li> <li>● Describe the embryological basis</li> </ul>	LGIS	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>and clinical presentation of hypospadias.</p> <ul style="list-style-type: none"> <li>• Enumerate the derivatives of mesonephric duct, paramesonephric duct and urogenital sinus in males and females.</li> <li>• Apply the knowledge of embryology to explain the basis and clinical presentation of following disorders of sexual development: <ul style="list-style-type: none"> <li>○ Ambiguous genitalia</li> <li>○ Hermaphrodites</li> </ul> </li> <li>• Enumerate the causes of sexual ambiguity and describe the most common cause (Congenital adrenal hyperplasia).</li> <li>• Explain gonadal dysgenesis.</li> <li>• Identify different components of male and female reproductive system on the given model.</li> <li>• Apply the knowledge of embryology to explain the following congenital anomalies: <ul style="list-style-type: none"> <li>○ Duplications of the uterus</li> <li>○ Uterus didelphys</li> <li>○ Uterus arcuatus</li> <li>○ Uterus bicornis.</li> <li>○ Vaginal atresia</li> </ul> </li> </ul>		
6.	<b>Introduction &amp; organization of the nervous system</b>	Comprehend the basic organization of the main structures that form nervous system and gain a three-dimensional appreciation of the parts of the brain	<ul style="list-style-type: none"> <li>• Enlist the major divisions, components and functions of the central nervous system.</li> <li>• Enumerate ventricles and coverings of brain and spinal cord with special emphasis on</li> </ul>	SGDs	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		and their relative positions to one another.	<p>intracranial hemorrhages.</p> <ul style="list-style-type: none"> <li>• Summarize the process of lumbar puncture and enumerate the structures through which a needle will pass while performing spinal tap.</li> <li>• Demonstrate the structural anatomy of major divisions of central and peripheral nervous system in prosected specimens/models.</li> <li>• Describe the etiology, signs and symptoms of multiple sclerosis and herpes zoster.</li> <li>• Conclude the response of neuron in central nervous system and peripheral nerves to injuries with special reference to myasthenia gravis</li> </ul>		
7.	<b>Gross Anatomy of skull</b>	Appraise the gross features of cranial cavity and the structures contained within it to understand the anatomical basis of clinical conditions related to them.	<ul style="list-style-type: none"> <li>• Demonstrate the anatomical position of skull with special emphasis on planes of anatomical position.</li> <li>• Describe and demonstrate the boundaries and gross features of cranial fossae.</li> <li>• Enlist and demonstrate foramina along with structures passing through them in anterior, middle and posterior cranial fossae.</li> <li>• Recognize and demonstrate the important sutures, fontanelle and</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			impressions on the interior of cranial vault.		
8.	<b>Gross Anatomy of Spinal cord</b>	Correlate the position and functions of the main nervous pathways and nerve cell groups in the spinal cord, with associated segmental injuries and diseases.	<ul style="list-style-type: none"> <li>• Explain the gross appearance and the nerve cell groups in the anterior, posterior and lateral gray columns of spinal cord</li> <li>• Enumerate and illustrate the arrangements of ascending and descending tracts (white matter) in spinal cord at various levels.</li> <li>• Explain the given clinical conditions related to ascending and descending tracts of spinal cord. <ul style="list-style-type: none"> <li>○ Tabes dorsalis</li> <li>○ Pyramidal tracts (upper motor neuron) lesions</li> <li>○ Extrapyramidal tracts (upper motor neuron) lesions</li> <li>○ Lower motor neuron lesions</li> <li>○ Acute spinal cord injuries</li> <li>○ Spinal shock syndrome</li> <li>○ Destructive spinal cord syndromes <ul style="list-style-type: none"> <li>▪ Complete cord transection syndrome</li> <li>▪ Anterior cord syndrome</li> <li>▪ Central cord syndrome</li> <li>▪ Brown sequard syndrome</li> <li>▪ Syringomyelia</li> <li>▪ Poliomyelitis</li> </ul> </li> </ul> </li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE VIVA VOCE

			<ul style="list-style-type: none"> <li>▪ Multiple sclerosis</li> <li>▪ Amyotrophic lateral sclerosis</li> </ul> <ul style="list-style-type: none"> <li>• Trace following pathways of superficial and deep sensations indicating the location of first, second and third order neurons. <ul style="list-style-type: none"> <li>○ Pain and temperature pathways</li> <li>○ Light touch and pressure pathways</li> <li>○ Discriminative touch, vibratory sense and conscious muscle joint sense.</li> <li>○ Muscle joint sense pathways to the cerebellum</li> </ul> </li> <li>▪ Posterior spinocerebellar tract</li> <li>▪ Anterior spinocerebellar tract</li> <li>▪ Cuneocerebellar <ul style="list-style-type: none"> <li>○ Spinotectal tract</li> <li>○ Spinoreticular tract</li> <li>○ Spino-olivary tract</li> <li>○ Visceral sensory tracts</li> </ul> </li> <li>• Trace following pathways of voluntary movements indicating the location of first, second and third order neurons. <ul style="list-style-type: none"> <li>○ Cortico spinal tracts</li> <li>○ Reticulospinal tract</li> <li>○ Tectospinal tract</li> <li>○ Rubrospinal</li> <li>○ Vestibulospinal</li> <li>○ Olivospianl</li> <li>○ Descending autonomic fibers</li> <li>○ Intersegmental tract</li> </ul> </li> </ul>		
--	--	--	---	--	--

9.	<b>Gross anatomy of the brainstem</b>	Appraise the anatomy of brainstem to assess the signs and symptoms presented by the patient in identifying the exact location of a structural lesion.	<ul style="list-style-type: none"> <li>• Describe the gross appearance and internal structure of the medulla oblongata.</li> <li>• Illustrate the cross sections of medulla oblongata at different levels.</li> <li>• Explain the effects of raised pressure in posterior cranial fossa on the structures contained within it.</li> <li>• Apply the knowledge of neuroanatomy to explain the following clinical conditions: <ul style="list-style-type: none"> <li>○ Arnold-chiari malformation</li> <li>○ Medial medullary syndrome</li> <li>○ lateral medullary syndrome of Wallenberg.</li> </ul> </li> <li>• Describe the gross features and internal structure of pons.</li> <li>• Illustrate cross section of pons at different levels showing major structures at each level.</li> <li>• Analyze the anatomical structures involved in Pontine hemorrhage and infarction of pons.</li> <li>• Describe the gross appearance, internal structure of mid brain.</li> <li>• Illustrate cross sections at the level of superior colliculus and inferior colliculus showing major structures at each level.</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ VIVA VOCE
----	---------------------------------------	---	---	-----	--------------------------------------

			<ul style="list-style-type: none"> <li>Justify the lesions of midbrain structures by the blockage of cerebral aqueduct.</li> <li>Identify the gross features of medulla, mid brain and pons on a given model.</li> </ul>		
10.	<b>Gross anatomy of cerebellum &amp; its connections</b>	Appraise the structure, function and connections of the cerebellum with the remainder of the central nervous system to understand the anatomical basis of cerebellar dysfunctions.	<ul style="list-style-type: none"> <li>Describe the gross features and phylogenetic divisions of cerebellum.</li> <li>Enumerate afferent and efferent fibers of superior, middle and inferior cerebellar peduncles.</li> <li>Enlist intracerebellar nuclei and types of fibers constituting white matter of cerebellum and explain their routes of entry and exit.</li> <li>Summarize and demonstrate the pathways carrying afferent and efferent fibers to and from the cerebellum.</li> <li>Enlist disturbances of voluntary movements, reflexes, ocular movements, speech, posture and gait resulting due to lesions of cerebellum.</li> <li>Demonstrate different parts of cerebellum on given model.</li> <li>Illustrate flattened view of cerebellar cortex showing the main cerebellar lobes.</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE
11.	<b>Gross anatomy of cerebrum</b>	Appraise the structure, function and connections of the cerebrum	<ul style="list-style-type: none"> <li>Describe the topographic anatomy of diencephalon and demonstrate its gross</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		<p>with the remainder of the central nervous system to understand the anatomical basis of associated clinical conditions.</p>	<p>features on a given model.</p> <ul style="list-style-type: none"> <li>• Enlist main sulci and gyri of cerebral hemispheres and describe the extent of each of them.</li> <li>• Explain the divisions of cerebral lobes on superolateral, medial and inferior surfaces of cerebral hemispheres.</li> <li>• Enumerate fibers making up the white matter of cerebral hemispheres and describe each of them.</li> <li>• Explain the effects of lesions of different parts of internal capsule</li> <li>• Explain the signs, symptoms, microscopic changes, diagnosis and treatment of Alzheimer disease.</li> <li>• Mark main sulci and gyri on lobes of cerebral hemispheres.</li> <li>• Identify commissural, projection and association fibers on brain prosected specimen</li> <li>• Describe and demonstrate the cortical functional areas in different lobes of cerebral hemispheres.</li> <li>• Describe the effects of lesions in the motor cortex on voluntary movements and speech.</li> <li>• Describe the changes in personality due to lesions in the frontal</li> </ul>		
--	--	---	--	--	--

			<p>eye field of cerebral hemisphere.</p> <ul style="list-style-type: none"> <li>• Enumerate types of aphasia and describe the lesions of speech areas responsible for producing aphasia.</li> <li>• Summarize the sign and symptoms due to lesions of sensory cortex, prefrontal cortex and somesthetic association areas.</li> <li>• Explain the effects of lesion in the primary and secondary visual cortex.</li> <li>• Illustrate diagrams showing probable pathways involved in reading a sentence and repeating it out loud.</li> <li>• Illustrate diagrams showing probable pathways involved in hearing a question and answering it.</li> <li>• Illustrate the lateral and medial views of cerebral hemispheres showing motor and sensory areas.</li> </ul>		
12.	<b>Gross anatomy of reticular formation &amp; limbic system</b>	Correlate the structure and function of the reticular formation and parts of the limbic system with associated clinical conditions.	<ul style="list-style-type: none"> <li>• Describe the general arrangement and functions of reticular formation.</li> <li>• Enlist afferent and efferent projections of reticular formation</li> <li>• Enumerate components of limbic system and explain hippocampal formation with reference to its afferent and efferent connections</li> <li>• Compile the effects of destruction of</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

			<p>amygdaloid complex on behavior.</p> <ul style="list-style-type: none"> <li>Identify different components of limbic system on given model.</li> </ul>		
13.	<b>Gross anatomy of basal nuclei &amp; their connections</b>	Appraise the location, connections and functions of basal nuclei to explain its common relevant diseases	<ul style="list-style-type: none"> <li>Enlist terminology commonly used to describe the basal nuclei.</li> <li>Describe connections and functions of different nuclei constituting basal ganglia</li> <li>Enlist hyper kinetic disorders related with basal nuclei like chorea, hemiballismus and athetosis</li> <li>Describe Parkinson disease regarding etiology, characteristics signs and symptoms, types and treatment</li> <li>identify different components of basal ganglia on given model/specimen</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE
14	<b>Gross anatomy of cranial nerves</b>	Appraise the location and connections of motor and sensory nuclei of the cranial nerves to identify the correct site of relevant cranial nerve lesions.	<ul style="list-style-type: none"> <li>Enumerate the cranial nerves and classify them into sensory, motor and mixed nerves.</li> <li>Describe the nuclei and intracranial course of all cranial nerves.</li> <li>Apply the knowledge of neuroanatomy to explain the clinical conditions regarding the lesions of various cranial nerves.</li> <li>Identify different cranial nerves on given model/specimen</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

15.	<b>Gross anatomy of thalamus, Hypothalamus &amp; their connections</b>	Appraise the structure, function and connections of the thalamus and hypothalamus with the remainder of the central nervous system to understand the anatomical basis of associated clinical conditions.	<ul style="list-style-type: none"> <li>• Describe the divisions, nuclei and connections of thalamus.</li> <li>• Enlist nuclei and connections of hypothalamus.</li> <li>• Summarize the connections of hypothalamus with the pituitary gland.</li> <li>• Enlist the functions of main hypothalamic nuclei.</li> <li>• Describe the following clinical disorders associated with hypothalamic lesions. <ul style="list-style-type: none"> <li>○ Obesity and wasting</li> <li>○ Sexual disorders</li> <li>○ Hyper and hypothermia</li> <li>○ Diabetes insipidus</li> <li>○ Emotional disorders.</li> <li>○ Thalamic pain</li> <li>○ Thalamic hand</li> </ul> </li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE
16.	<b>Gross anatomy of meninges and Dural venous sinuses of brain &amp; spinal cord</b>	Appraise the arrangement of the meninges of brain and spinal cord to identify different types of cerebral hemorrhages.	<ul style="list-style-type: none"> <li>• Define meninges of brain and describe the Dural reflections in brain.</li> <li>• Explain the meninges of spinal cord</li> <li>• Enumerate the nerves and blood vessels supplying the meninges.</li> <li>• Differentiate among different varieties of intracranial hemorrhages.</li> <li>• Demonstrate the supratentorial and infratentorial compartments of tentorium cerebelli in a prosected specimen.</li> <li>• Define and enumerate paired and unpaired</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>Dural venous sinuses along with their attachments.</p> <ul style="list-style-type: none"> <li>Describe the location, important relations, communications of cavernous sinus and enumerate structures passing through it.</li> </ul>		
17.	<b>Gross anatomy of ventricular system, the CSF, &amp; the blood-brain &amp; blood-CSF barriers</b>	Appraise the anatomical organization of ventricular system, the CSF, & the blood-brain & blood-CSF barriers to explain the relevant clinical scenarios.	<ul style="list-style-type: none"> <li>Describe the anatomical organization of ventricular system of brain and explain the boundaries of each ventricle along with their choroid plexus.</li> <li>Explain formation, circulation and absorption of CSF.</li> <li>Define arachnoid villous and explain the role of arachnoid villi in absorption of CSF.</li> <li>Summarize the formation of different barriers of brain.</li> <li>Demonstrate queckenstedt sign in localizing blockage of subarachnoid space in vertebral canal.</li> <li>Illustrate the floor of fourth ventricle.</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE
18.	<b>Blood supply of the brain &amp; spinal cord</b>	<ul style="list-style-type: none"> <li>Comprehend the blood supply of brain and spinal cord</li> <li>To explain the dysfunction that would result if the artery were blocked.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the blood supply of different parts of brain and spinal cord.</li> <li>Explain the formation and importance of veins of brain.</li> <li>Enumerate the vessels taking part in the formation of circle of Willis and summarize its importance.</li> </ul>	SGD	MCQs/ SEQs/ SAQs/ OSPE/ VIVA VOCE

			<ul style="list-style-type: none"> <li>• Relate the interruption of cerebral circulation to cerebral artery syndromes due to anterior, middle and posterior cerebral artery occlusion.</li> <li>• Illustrate circle of Willis.</li> </ul>		
<b>Practicals</b>	Identify the slides under light microscope	Identification of following slides under light microscope <ul style="list-style-type: none"> <li>• Peripheral nerve</li> <li>• Ganglia</li> <li>• Spinal cord</li> <li>• Cerebellum</li> <li>• Cerebrum</li> <li>• Testes</li> <li>• Epididymis</li> <li>• Vas deferens</li> <li>• Prostate</li> <li>• Seminal vesicles</li> <li>• Ovaries</li> <li>• Fallopian tubes</li> <li>• Uterus</li> <li>• Vagina</li> </ul>			OSPE/Long slides

PHYSIOLOGY					
S.No.	Topic/ Theme	Learning outcomes	Learning Objective/ Content	Instructional strategies	Assessment tool
1.	<b>Processing of information in neuronal pool</b>	Interpret the physiological mechanisms controlling the neuronal signals transmitting through synapse	<ul style="list-style-type: none"> <li>• Differentiate between various synapses</li> <li>• Identify physiologic anatomy of the synapse</li> <li>• Elucidate the electrical events during neuronal excitation and inhibition</li> <li>• Summarize the transmission and processing of signals in neuronal pools (relaying of signals through neuronal pools prolongation of a signal by a neuronal pool, after discharge, synaptic fatigue)</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>
2.	<b>Sensory receptors &amp; receptor Potential</b>	Interpret the physiological mechanisms controlling the functions of sensory system.	<ul style="list-style-type: none"> <li>• Classify the various types of sensory receptors.</li> <li>• Explain the sensory stimuli and differential sensitivity of receptors.</li> <li>• Explain the sensory transduction into nerve impulses.</li> <li>• Describe the local electrical currents at nerve endings— receptor potentials, adaptation of receptors</li> <li>• Classify the nerve fibers that transmit different types of signals on the physiological basis.</li> <li>• Describe the transmission of signals of different intensity in</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			nerve tract (spatial and temporal summation)		
3.	<b>Sensory tracts and cortex</b>	Explain the dorsal column medial lemniscal system and anterolateral pathways	<ul style="list-style-type: none"> <li>Identify the sensations carried by different sensory tracts</li> <li>Differentiate between different sensory tracts</li> <li>Describe the somatosensory cortex and somatosensory association areas</li> <li>Explain the various thermal sensations, thermal receptors and their excitation and transmission of thermal signals in the nervous system</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>SGD</li> <li>CBL</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>SAQ/SEQ</li> <li>Structured Viva</li> </ul>
4.	<b>Brain analgesia system</b>	Correlate the pathophysiological basis of pain pathways to their clinical significance	<ul style="list-style-type: none"> <li>Classify the different types of pain.</li> <li>Compare and contrast the perception and transmission of the different types of pain.</li> <li>Explain the pain suppression system in the brain and spinal cord.</li> <li>Describe the brain's opiate system—endorphins and enkephalins.</li> <li>Describe the clinical abnormalities of pain and other somatic sensations</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>SGD</li> <li>CBL</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>SAQ/SEQ</li> <li>Structured Viva</li> </ul>
5.	<b>Motor system / Spindle / stretch reflex</b>	Interpret the physiological mechanisms controlling the functions of motor system and higher mental functions.	<ul style="list-style-type: none"> <li>Relate the organization of grey and white matter in spinal cord to the pathophysiology of various spinal cord injuries.</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>SGD</li> <li>CBL</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>SAQ/SEQ</li> <li>Structured Viva</li> </ul>

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>• Explain the role of proprioceptors (muscle spindles and Golgi tendon organs) in motor movements</li> <li>• Explain stretch reflex</li> <li>• Describe the flexor reflex and the crossed extensor reflex.</li> <li>• Explain the reciprocal inhibition and reciprocal innervation.</li> <li>• Identify the reflexes of posture and locomotion in the spinal cord.</li> </ul>		
6.	<b>Cerebral Cortex</b>	Correlate the clinical presentations resulting from damage to different areas of cerebral cortex to their anatomical and functional cortical areas.	<ul style="list-style-type: none"> <li>• Identify the various Brodmann's areas of cerebral cortex.</li> <li>• Explain the functions of the various areas of the cerebral cortex.</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>
7.	<b>Pyramidal tract/ extra pyramidal tract</b>	Differentiate between the Pyramidal and extrapyramidal system for voluntary motor control.	<ul style="list-style-type: none"> <li>• Explain the role of primary motor cortex, premotor area, and supplementary motor area in control of voluntary motor movements.</li> <li>• Identify the various pathways for transmission of signals for voluntary motor control from the motor cortex to the muscles.</li> <li>• Explain the significance of anterior motor neurons as the lower motor neurons.</li> <li>• Compare and contrast the upper and lower</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>

			<p>motor neurons and their lesions.</p> <ul style="list-style-type: none"> <li>Identify the role of the brain stem in controlling motor function and role in posture of the body against gravity.</li> </ul>		
8.	<b>Cerebellum</b>	Analyze the role of the cerebellum in executing motor movements.	<ul style="list-style-type: none"> <li>Explain the functional anatomy of cerebellum and basal ganglia.</li> <li>Describe the neuronal circuits of the cerebellum.</li> <li>Describe the pathophysiological basis of the clinical abnormalities of the cerebellum and basal ganglia.</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>SGD</li> <li>CBL</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>SAQ/SEQ</li> <li>Structured Viva</li> </ul>
9.	<b>Basal ganglia</b>	Explain the function of the basal ganglia in executing patterns of motor activity.	<ul style="list-style-type: none"> <li>Identify the role of the basal ganglia for cognitive control of sequences of motor patterns</li> <li>Explain the function of the basal ganglia to change the timing, scale and intensity of voluntary motor movements.</li> <li>Explain the role of various specific neurotransmitter substances in the basal ganglia and the pathophysiological disorders related to their deficiency.</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>SGD</li> <li>CBL</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>SAQ/SEQ</li> <li>Structured Viva</li> </ul>
10.	<b>Vestibular system</b>	Explain the vestibular system	<ul style="list-style-type: none"> <li>Explain the vestibular apparatus and function of the utricle and saccule in the</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>SGD</li> <li>CBL</li> </ul>	<ul style="list-style-type: none"> <li>MCQ</li> <li>SAQ/SEQ</li> <li>Structured Viva</li> </ul>

			<p>maintenance of static equilibrium.</p> <ul style="list-style-type: none"> <li>• Describe the detection of head rotation by the semicircular ducts.</li> <li>• Explain the vestibular mechanisms for stabilizing the eyes.</li> </ul>		
11.	<b>Physiology of Speech</b>	Correlate the mechanism of normal coherent speech with speech disorders	<ul style="list-style-type: none"> <li>• Explain the functions of specific cortical areas and association areas in the physiology of speech.</li> <li>• Identify the function of the Wernicke's and Broca's Area.</li> <li>• Explain the pathophysiological disorders related to speech.</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>
12.	<b>Memory</b>	Distinguish memory types in detail	<ul style="list-style-type: none"> <li>• Describe memory and the role of synaptic facilitation and synaptic inhibition.</li> <li>• Explain short-term, intermediate and long-term memory.</li> <li>• Describe the consolidation of memory.</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>
13.	<b>Sleep</b>	Explain mechanism of sleep in detail	<ul style="list-style-type: none"> <li>• Define Sleep and its types.</li> <li>• Differentiate between slow-wave sleep and REM Sleep (paradoxical sleep, desynchronized sleep).</li> <li>• Describe the basic theories of sleep and physiologic effects of sleep.</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>

			<ul style="list-style-type: none"> <li>• Identify the different types of brain waves and their origin in the various parts of the brain.</li> <li>• Explain the changes in EEG at different stages of wakefulness and sleep.</li> </ul>		
14.	<b>EEG/epilepsy</b>	Differentiate between various types of epilepsy in detail	<ul style="list-style-type: none"> <li>• Explain the effect of varying levels of cerebral activity on the frequency of the EEG.</li> <li>• Define Epilepsy.</li> <li>• Differentiate between Grand mal, petit mal epilepsy and focal epilepsy</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>
15.	<b>Functions of thalamus and hypothalamus</b>	Explain the functions of thalamus and hypothalamus in detail with specific emphasis on temperature control and limbic system.	<ul style="list-style-type: none"> <li>• Explain the functional anatomy of thalamus.</li> <li>• Describe the functions of thalamus.</li> <li>• Identify the role of limbic system.</li> <li>• Describe the functional anatomy and functions of hypothalamus.</li> <li>• Identify the normal body temperatures.</li> <li>• Explain the mechanisms of heat production and heat loss.</li> <li>• Describe the regulation of body temperature and role of the hypothalamus</li> <li>• Explain the mechanisms that decrease or increase body temperature.</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>

			<ul style="list-style-type: none"> <li>• Appreciate the concept of a “set-point” for temperature control.</li> <li>• Appraise the behavioral control of body temperature.</li> <li>• Interpret the various abnormalities of body temperature regulation with special focus on fever.</li> </ul>		
16.	<b>Higher Mental Functions</b>	Associate functions of prefrontal and other cortical association areas to various psychiatric and organic illnesses.	<ul style="list-style-type: none"> <li>• Discuss the higher intellectual functions of the prefrontal areas and the various cortical association areas.</li> <li>• Describe the functions of corpus callosum.</li> <li>• Discuss the pathophysiology and symptoms of depression, bipolar disorders, schizophrenia and Alzheimer’s disease.</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>
17.	<b>Autonomic Nervous System</b>	Analyze the autonomic nervous system in detail	<ul style="list-style-type: none"> <li>• Explain the general organization and physiological anatomy of ANS.</li> <li>• Explain the different, neurotransmitters, receptors and effector organs of ANS.</li> <li>• Discuss the various functions of ANS.</li> <li>• Describe the autonomic reflexes.</li> <li>• Explain the various drugs effecting ANS.</li> <li>• Identify the various disorders related to ANS and their pathophysiological basis.</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> <li>• Structured Viva</li> </ul>

1	<b>Practicals</b>	Examine motor system on an SP		Practical	OSPE
2		Perform Deep Tendon reflexes			
3		Examine the Cerebellar Functions on an SP			
4		Examine the autonomic nervous system on an SP			
5		Examine the Sensory system on an SP			
6		Perform Superficial reflexes on an SP			
7		Record the normal body temperature			

Revised (V-II)

BIOCHEMISTRY					
S.No.	Topic/ Theme	Learning outcomes	Learning Objective/ Content	Instructional strategies	Assessment tool
1	<b>Nucleotide Chemistry</b>	Relate the significance of different nucleotide in medicine	<ul style="list-style-type: none"> <li>➤ Demonstrate the understanding of Chemistry and structure of nucleotide and their biochemical role</li> <li>➤ Explain Nucleotides, structure, their derivatives and their biochemical role</li> <li>➤ Discuss the synthetic derivatives of purine and pyrimidines, their role in health and disease</li> <li>➤ Describe Nucleic acids, their types, structure and functions</li> <li>➤ Outline the Synthesis of Purine nucleotides and deoxyribonucleotides</li> <li>➤ Explain the Salvage pathway of nucleotides</li> </ul>	<ul style="list-style-type: none"> <li>• LECTURES</li> <li>• PBL</li> <li>• CBL</li> <li>SGD</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> </ul>
2.	<b>Nucleotide Metabolism</b>	Apply the knowledge of nucleotide metabolism for understanding relevant metabolic disorders	<ul style="list-style-type: none"> <li>➤ Describe the degradation of purines with related diseases</li> <li>➤ Explain synthesis &amp; degradation of pyrimidines and state related diseases</li> <li>➤ Discuss the formation of Uric acid &amp; Hyperuricemia</li> </ul>	<ul style="list-style-type: none"> <li>• LECTURES</li> <li>• PBL</li> <li>• CBL</li> <li>• SGD</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> </ul>
3.	<b>Biochemical Genetics</b>	Apply the knowledge of molecular medicine, genetics,	<ul style="list-style-type: none"> <li>➤ Describe DNA Structure &amp; types</li> </ul>	<ul style="list-style-type: none"> <li>• LECTURES</li> <li>• PBL</li> <li>• CBL</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> </ul>

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		and biotechnology in health and disease	<ul style="list-style-type: none"> <li>➤ State organization of Eukaryotic DNA</li> <li>➤ Explain replication of prokaryotic DNA &amp; Eukaryotic DNA</li> <li>➤ Explain Super coiling of DNA</li> <li>➤ Describe DNA Repair Mechanisms</li> <li>➤ Explain Xeroderma Pigmentosum</li> <li>➤ Discuss various Genetic Diseases</li> <li>➤ Give Structure of three types of RNA</li> <li>➤ Outline Prokaryotic and Eukaryotic transcription.</li> <li>➤ Explain Reverse transcription</li> <li>➤ Describe translation, Post Translational Modification &amp; translation of genetic code</li> <li>➤ Write a note on Mutations</li> <li>➤ Outline regulation of Gene expression</li> <li>➤ Write a note on PCR&amp; Southern blotting techniques</li> <li>➤ Explain Probes</li> <li>➤ Explain Prenatal Diagnosis</li> <li>➤ Discuss Gene therapy &amp; gene expression</li> <li>➤ Summarize DNA Cloning</li> <li>➤ Explain Restriction fragment length polymorphism</li> </ul>	<ul style="list-style-type: none"> <li>• SGD</li> </ul>	
--	--	---	---	---	--

4.	<b>Neurotransmitters</b>	Relate the importance of various neurotransmitters to its clinical significance	<ul style="list-style-type: none"> <li>➤ Write a note on Catecholamines, their chemistry, synthesis and degradation</li> <li>➤ Explain synthesis and role of Acetyl choline, Dopamine, Serotonin and Histamine</li> <li>➤ Discuss the Dopaminergic neurotransmission (Including site of synthesis, stimulus for secretion, mechanism of action, receptors, intracellular effects, target cells, tissues and biochemical role/functions)</li> <li>➤ Explain synthesis and biochemical role of Glutamate, GABA &amp; NO</li> </ul>	<ul style="list-style-type: none"> <li>• LECTURES</li> <li>• PBL</li> <li>• CBL</li> <li>• SGD</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> </ul>
5.	<b>Cancer and tumor markers</b>	<ul style="list-style-type: none"> <li>➤ Correlate tumor markers in different malignancies</li> <li>➤ Outline the genetic basis of cancer</li> </ul>	<ul style="list-style-type: none"> <li>➤ Discuss different tumor markers</li> <li>➤ Comprehend genetic basis of cancer</li> </ul>	<ul style="list-style-type: none"> <li>• LECTURES</li> <li>• PBL</li> <li>• CBL</li> <li>SGD</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>SAQ/SEQ</li> </ul>
6.	<b>Xenobiotics, aging and free radicals</b>	<ul style="list-style-type: none"> <li>➤ Outline the essential feature of aging and genetic factors of aging</li> <li>➤ Elaborate the role of reactive oxygen species and xenobiotics</li> </ul>	<ul style="list-style-type: none"> <li>➤ Describe xenobiotics</li> <li>➤ Outline phase 1 and phase 2 reactions,</li> <li>➤ Discuss the properties of Cytochrome P450, its functions and clinical importance</li> </ul>	<ul style="list-style-type: none"> <li>• LECTURES</li> <li>• PBL</li> <li>• CBL</li> <li>• SGD</li> </ul>	<ul style="list-style-type: none"> <li>• MCQ</li> <li>• SAQ/SEQ</li> </ul>
<b>Practicals</b>		Perform and interpret the results of given examination	<ul style="list-style-type: none"> <li>➤ Collection and preservation of clinical specimens</li> <li>➤ Estimation and clinical interpretation of <b>Uric Acid</b> in blood</li> </ul>	Practical	OSPE

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		<ul style="list-style-type: none"> <li>➤ Estimation and clinical interpretation of <b>Bilirubin</b> in blood</li> <li>➤ <b>DNA Extraction</b></li> <li>➤ <b>PCR</b></li> </ul>		
--	--	--	--	--

Medicine	Block II (2 <sup>nd</sup> Year)	CNS (08 Weeks)			
S.No.	Topic/ Theme	Learning outcomes	Learning Objectives/ Content	Instructional strategies	Assessment tool
1.	<b>Brown Sequard Syndrome</b>	Correlate the relevant basic knowledge with clinical presentations	<ul style="list-style-type: none"> <li>• Demonstrate understanding of basic concepts</li> <li>• Justify the clinical presentation with reasoning</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
2.	<b>Upper and Lower motor neuron tension</b>				
3.	<b>Parkinsonism</b>				
4.	<b>Cerebellar Disease</b>				
5.	<b>Alzheimer Disease</b>				
6.	<b>Gout, SCID and Lesch/ Nyhan syndrome</b>				
7.	<b>Clinically important Genetic Disorders 1</b>				
8.	<b>Clinically important Genetic Disorders 2</b>				

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

## Surgery

### Neuroanatomy Module

S.No	Topics	Learning Outcomes	Learning objectives	MIT	Assessment tool
		<b>By the end of session, student should be able to:</b>			
1.	<b>Spinal trauma and injuries</b>	Correlate the relevant basic knowledge with clinical presentations	<ul style="list-style-type: none"> <li>Demonstrate understanding of basic concepts of brain and spinal cord</li> <li>Justify the clinical presentation with reasoning</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
2.	<b>Comminuted frontal complex skull fracture</b>				
3.	<b>Neural tube defects</b>				
4.	<b>Brain tumors</b>				
5.	<b>Vascular lesions and hemorrhages</b>				
6.	<b>Spinal nerve compressions</b>				
7.	<b>Developmental anomalies of brain</b>				

### Research Methodology

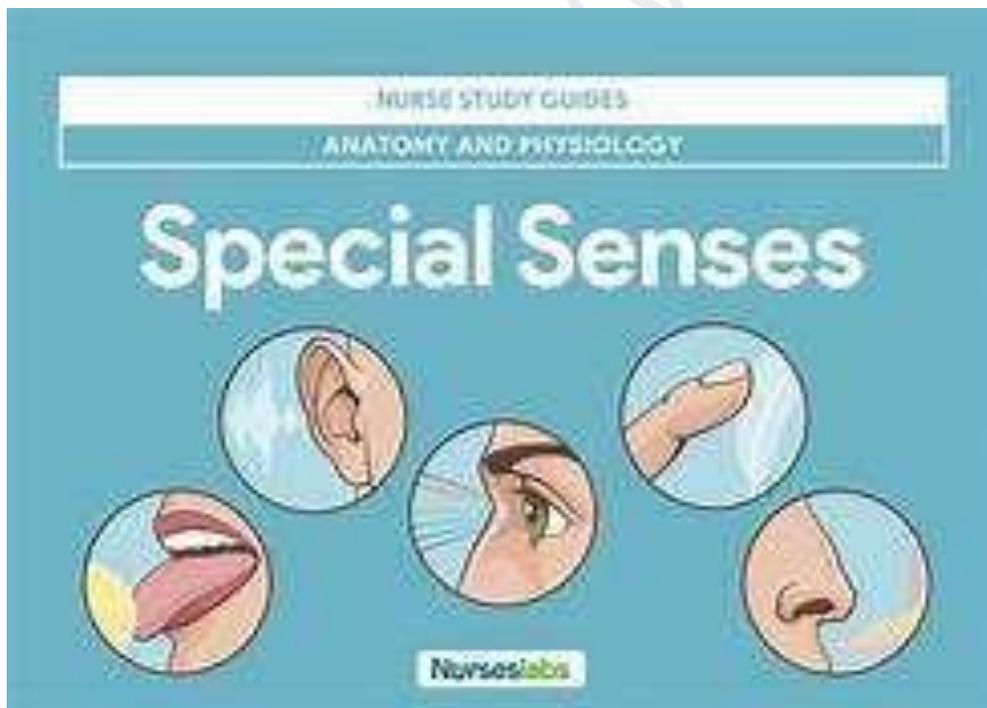
S.No	Topic/ Theme	Learning Outcomes	Learning Objectives/Contents	Instructional strategies	Assessment Tool
1.	<b>Sampling techniques</b>	Use different sampling techniques in research	Probability and non-probability sampling. Types of sampling techniques	LGIS/ Group assignment	MCQ/ SEQ
2.	<b>Ethical issues in research</b>	Apply ethical principles to resolve issues for human research	Helsinki declaration, Hippocratic oath Ethical issues in research Elements of informed consent	LGIS/ SGD	MCQ/ SEQ
3.	<b>Research ethics</b>	Understand ethical concerns relating to different aspects of research organizations	Ethical issues relating to researcher, participants and sponsoring organization Institutional review board	LGIS/ SGD	MCQ/ SEQ

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

# BLOCK-III

- Special Senses
- Endocrinology & Reproduction (ENR)
- Head & Neck



*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

### **1. Introduction:**

This block comprises of following modules:

Special Senses/Endocrinology & Reproduction (ENR) /Head & Neck

### **2. Duration:**

Total duration of the block is 12 weeks. 10 weeks are for teaching and learning and 2 weeks are for end block assessment

### **3. Preamble**

The emphasis of this module is on histo-morphological and embryological structure of special senses and endocrinology/reproductive system as well as the mechanisms involved in regulating hormone levels in an integrated manner. This module also includes the role of nutrition in different metabolic disorders and allows students to appraise integration and regulation of metabolic pathways in different tissues. Learning process involves delivering the content with clinical relevance. This makes medical student to understand the importance of Central Nervous system in the fields of Medicine.

The research methodology, Behavioral Sciences & Professionalism will be taught as a part of the longitudinal theme.

### **Learning Outcomes**

**At the end of this module, student will be able to:**

- Differentiate between H&E stained slides of special senses, endocrine glands, integumentary system and oral cavity to predict functional outcomes that result from their altered structure and function.
- Correlate the embryological basis of special senses, head and neck and integumentary system with various relevant congenital anomalies.
- Apply the concepts of gross anatomy of bones, viscera, muscles, neurovascular components and joints of head and neck to deal with the common prevalent diseases in future.
- Utilize the knowledge of gross anatomy, arterial supply venous drainage and lymphatic drainage of the head and neck with special emphasis on the spread of infection from face to brain.
- Correlate the physiological and biochemical concepts related to special senses and endocrinology/reproductive system with their anatomical knowledge
- Appraise the integration and regulation of metabolic pathways in different tissues
- Apply the knowledge of nutrition for better understanding of relevant disorders
- Relate their relevant knowledge of this module in subsequent years of clinical training and practice
- Describe the physiology of special senses including their nervous pathways and interpret the abnormalities related to them.
- Explain the basic principles of endocrinology along with the functions and related abnormalities of various endocrine glands.
- Describe the male and female reproductive functions and their abnormalities.

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

<b>ANATOMY</b>					
<b>S.No</b>	<b>Topic/ Theme</b>	<b>Learning outcomes</b>	<b>Learning Objective/ Content</b>	<b>Instructional strategies</b>	<b>Assessment tool</b>
1.	<b>Skull</b>	Elucidate the topographic anatomy of skull	<ul style="list-style-type: none"> <li>• Appreciate the general plan of studying skull from different views.</li> <li>• Identify important bony landmarks on the bones as viewed from lateral, superior, inferior, anterior and posterior views.</li> <li>• List structures traversing the foramina in these bones</li> <li>• Identify the bones forming the boundaries of orbit, nasal cavity, oral cavity, temporal, infratemporal fossa &amp; pterygopalatine fossa on the given bone. (detail to be done with relevant topics)</li> </ul>	SGD (Small Group Discussion)	MCQ/SAQ/OSPE Viva
2.	<b>Mandible</b>	Elucidate the topographic anatomy of mandible	<ul style="list-style-type: none"> <li>• Identify parts of mandible</li> <li>• Describe ramus and body of mandible with respect to its bony features and attachments.</li> </ul>	SGD (Small Group Discussion)	MCQ/SAQ/OSPE Viva
3.	<b>Cervical vertebrae</b>	<ul style="list-style-type: none"> <li>• Distinguish cervical vertebrae from thoracic and lumbar vertebrae.</li> <li>• Differentiate typical and</li> </ul>	<ul style="list-style-type: none"> <li>• Give distinguishing features of each cervical vertebra.</li> <li>• Enumerate structures passing through foramina</li> </ul>	SGD (Small Group Discussion)	MCQ/SAQ/OSPE Viva

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		atypical cervical vertebrae	<ul style="list-style-type: none"> <li>Identify type and movements of atlantoaxial and atlantooccipital joints</li> <li>Outline ligamentous attachments on cervical vertebrae.</li> </ul>		
4.	<b>Scalp</b>	Correlate the structure and neurovascular supply of scalp with anatomical basis of relevant clinical conditions.	<ul style="list-style-type: none"> <li>Appraise extent of scalp on model</li> <li>Enumerate layers of scalp in a sequential order</li> <li>Correlate gross features of each layer with anatomical basis of black eye, profuse bleeding, gaping wound, spread of scalp infection and shape of hematoma.</li> </ul>	SGD and dissection	MCQ/ SAQ/OSPE Viva
5.	<b>Temporal region (Infratemporal fossa)</b>	Correlate the structure of Infratemporal fossa with anatomical basis of relevant clinical conditions	<ul style="list-style-type: none"> <li>Identify the location of Infratemporal fossa on a given model and skull</li> <li>Enlist structure forming boundaries of Infratemporal fossa</li> <li>Enumerate communication of Infratemporal fossa and structures traversing each</li> <li>Enlist contents of Infratemporal fossa</li> <li>Discuss the relation of contents of Infratemporal fossa</li> </ul>	SGD and dissection	MCQ/ SAQ/OSPE Viva
6.	<b>Face</b>	Correlate the gross anatomy of face with anatomical basis of relevant clinical conditions.	<ul style="list-style-type: none"> <li>Outline the characteristic features of facial skin.</li> <li>Elucidate the cutaneous innervation of face</li> </ul>	SGD and dissection	MCQ/ SAQ/OSPE Viva

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>• Group facial muscles according to the orifices they are guarding</li> <li>• Describe the nerve supply of muscles of facial expressions.</li> <li>• Describe the course of arteries, veins, lymphatics and nerves of the face with the help of model.</li> <li>• Correlate gross features of face with anatomical basis of danger area, trigeminal neuralgia, Bell's palsy.</li> </ul> <p><b>Skill:</b></p> <ul style="list-style-type: none"> <li>• Identify muscles of facial expressions</li> <li>• Illustrate the cutaneous innervation of face</li> </ul>		
7.	<b>Salivary glands</b>	Appraise the location, neurovascular supply of major salivary glands with understanding of relevant clinical conditions on anatomical basis.	<ul style="list-style-type: none"> <li>• Enumerate salivary glands.</li> <li>• Describe the location of major salivary glands (anatomical relations) along with opening of their ducts.</li> <li>• Trace the secretomotor nerve supply of major salivary glands.</li> <li>• Discuss mumps.</li> <li>• Discuss benign and malignant conditions of parotid gland with special emphasis on</li> </ul>	SGD and dissection	MCQ/ SAQ/OSPE Viva

			<p>involvement of facial nerve.</p> <ul style="list-style-type: none"> <li>• Discuss submandibular duct stone and its surgical removal.</li> </ul>		
8.	<b>Neck</b>	Describe skin, superficial fascia, and cutaneous nerves of neck	<ul style="list-style-type: none"> <li>• Outline contents of superficial fascia of neck (platysma, external jugular vein)</li> <li>• Illustrate cutaneous innervation of neck</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva
9.	<b>Deep cervical fascia</b>	<ul style="list-style-type: none"> <li>• Anatomize the four layers of deep cervical fascia in detail.</li> <li>• Correlate the topography of cervical fascial spaces to mediastinal and contralateral spread of infection.</li> </ul>	<ul style="list-style-type: none"> <li>• Enumerate the layers of deep cervical fascia.</li> <li>• Trace the attachments of investing, pre-tracheal, carotid sheath and prevertebral layers of fascia.</li> <li>• Identify various modifications and neck spaces formed by fascial attachments.</li> <li>• Comprehend the clinical importance of neck spaces in spread of infection</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva
10.	<b>Triangles of neck</b>	Link the anatomical location of triangles of neck and their contents with their clinical significance.	<ul style="list-style-type: none"> <li>• Tabulate the attachments, nerve supply, actions of superficial and deep muscles of neck (sternocleidomastoid, suprahyoid, infrahyoid, sub occipital, prevertebral muscles,).</li> <li>• Identify boundaries and contents of</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva

			<p>triangles of neck on model</p> <ul style="list-style-type: none"> <li>Describe the origin, course and distribution of vessels and nerves of neck (cervical plexus, Ansa cervicalis, Common carotid artery, Internal jugular vein, subclavian vessels )</li> <li>Analyze a case of lesion to accessory, glossopharyngeal and vagus nerve on anatomical basis.</li> <li>Describe the clinical features of torticollis</li> </ul>		
11.	<b>Submandibular region</b>	Correlate the anatomy of Submandibular region with its clinical significance	<ul style="list-style-type: none"> <li>Revisit boundaries of submandibular triangle</li> <li>Describe the parts, relations, neurovascular of submandibular gland.</li> <li>Trace the routes of submandibular ganglion</li> <li>Describe the distribution of</li> <li>submandibular ganglion</li> <li>Correlate the anatomy of submandibular fascial space with Ludwig's angina</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva
12.	<b>Parotid region</b>	Correlate the anatomy of parotid region with its clinical significance	<ul style="list-style-type: none"> <li>List contents of parotid region</li> <li>Elucidate the surfaces, borders, shape, location, parts,</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva

			<p>relations and drainage of parotid gland</p> <ul style="list-style-type: none"> <li>• Trace the pathway of autonomic supply of parotid gland.</li> <li>• Enumerate structures embedded in parotid gland in a sequential order.</li> <li>• Analyze anatomical basis of clinical presentation of mumps.</li> <li>• Correlate the extracranial course of facial nerve with Bell's palsy.</li> </ul>		
13.	<b>Temporomandibular joint</b>	Correlate the gross anatomical features of temporomandibular joint with clinical significance	<ul style="list-style-type: none"> <li>• Outline the type, articular surfaces, capsule, ligaments, supporting factors, movements and nerve supply of TMJ</li> <li>• Describe movements of TMJ with reference to axes and muscles producing them</li> <li>• Correlate a case of dislocation and reduction of TMJ with anatomical knowledge of TMJ.</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva
14.	<b>Temporal and Infra-temporal region</b>	Correlate the location, boundaries and contents of temporal and Infratemporal fossa with relevant clinical conditions.	<ul style="list-style-type: none"> <li>• Identify the location, boundaries, contents and communications of temporal and infratemporal fossa on a given model and skull.</li> <li>• Describe the course and distribution of mandibular nerve</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>from origin to distribution</p> <ul style="list-style-type: none"> <li>• Tabulate the attachments, actions and nerve supply of muscles of mastication.</li> <li>• Trace location, various routes and distribution of otic ganglion</li> <li>• Justify role of lateral pterygoid as a peripheral heart on anatomical basis of pterygoid venous plexus</li> <li>• Elucidate importance of pterygoid venous plexus in case of intracranial spread of infection to cavernous sinus.</li> <li>• Trace origin and distribution of superficial temporal, First and second parts of maxillary artery</li> <li>• Trace origin and distribution of Chorda tympani from origin to till it joins the lingual nerve.</li> </ul>		
15.	<b>Oral Cavity and tongue</b>	Correlate the gross anatomy of oral cavity and tongue with anatomical basis of relevant clinical conditions	<ul style="list-style-type: none"> <li>• Outline the floor, roof, lateral walls and vestibule of oral cavity.</li> <li>• Describe topographic features of tongue.</li> <li>• Tabulate the actions and nerve supply of</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva

			<p>muscles (intrinsic and extrinsic) of tongue</p> <ul style="list-style-type: none"> <li>• Differentiate a case of UMN and LMN lesion of hypoglossal nerve</li> <li>• Correlate Lymphatic drainage of different parts of tongue with spread of malignancy and infection of tongue.</li> <li>• Tabulate the attachments, nerve supply, actions of muscles of soft palate.</li> </ul> <p>Trace the pathway of gag reflex</p>		
16.	<b>Nose and paranasal sinuses</b>	Correlate the gross anatomy of Nose and paranasal sinuses with relevant clinical conditions	<ul style="list-style-type: none"> <li>• Describe the skeletal framework of different walls of nose</li> <li>• Describe the features, vascular supply, nerve supply and openings in lateral wall of nose</li> <li>• Describe the features, vascular supply, nerve supply of medial wall of nose</li> <li>• Highlight the significance of little's area in a case of epistaxis</li> <li>• Trace the location and drainage of paranasal sinuses in skull and on radiograph</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva
17.	<b>Pterygopalatine fossa</b>	Describe the anatomy of Pterygopalatine fossa in relation with surrounding structures	<ul style="list-style-type: none"> <li>• Identify the location of pterygopalatine fossa on skull</li> <li>• List bones forming walls of pterygopalatine fossa</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>• Enumerate its contents and communications</li> <li>• Describe the distribution of third part of maxillary artery, nerve and pterygopalatine ganglion</li> <li>• Justify the role of pterygopalatine ganglion in hay fever/allergies</li> </ul>		
18.	<b>Pharynx</b>	Correlate the gross anatomy of pharynx with relevant clinical conditions	<ul style="list-style-type: none"> <li>• Differentiate extent, anatomical features, vascular supply, nerve supply of three parts of pharynx on anatomical basis</li> <li>• List muscles of pharynx with nerve supply and action</li> <li>• Name structures passing through the spaces between muscles of pharynx</li> <li>• Trace origin of pharyngobasilar fascia on base of skull.</li> <li>• Correlate anatomical knowledge of pharyngobasilar fascia with patency of nasopharynx</li> <li>• Justify role of Eustachian tube in equalizing middle ear pressure, age related obliquity</li> <li>• Describe anatomical route of spread of infections from</li> </ul>	SGD and dissection	MCQ/ SAQ/OSPE Viva

			<p>nasopharynx to middle ear.</p> <ul style="list-style-type: none"> <li>• Relate boundaries of tonsillar fossa and tonsillar bed with significant structures that must be protected during tonsillectomy.</li> <li>• Define Kilian's dehiscence</li> </ul>		
19.	<b>Larynx</b>	Correlate the gross anatomy of larynx with relevant clinical conditions	<ul style="list-style-type: none"> <li>• Describe laryngeal wall in detail with emphasis on cartilages, ligaments, muscles, vascular supply and nerve supply.</li> <li>• Analyze mechanism of abduction and adduction of vocal cords</li> <li>• Distinguish clinical presentations of injury to external, internal and recurrent laryngeal nerves.</li> <li>• Recognize Clinical significance of piriform fossa</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva
20.	<b>Thyroid and parathyroid glands</b>	Correlate the gross anatomy of thyroid and parathyroid glands with relevant clinical conditions	<ul style="list-style-type: none"> <li>• Identify gross features of thyroid and parathyroid glands on models.</li> <li>• Describe capsule, relations and blood supply of thyroid and parathyroid gland</li> <li>• Justify anatomical basis of movement of thyroid gland during deglutition</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>Discuss surgical precautions in thyroid surgery while ligating vessels and enucleation</li> </ul>		
21.	<b>Lymphatic drainage of head and neck</b>	Appraise the lymphatic drainage of neck with understanding of relevant clinical conditions on anatomical basis.	<p>Enumerate the groups of lymph nodes draining the neck.</p> <p>Describe their location and areas of drainage.</p> <p>Describe the formation of jugular lymph trunk.</p> <p>Describe the clinical importance of lymphatic drainage of head and neck.</p> <p>Enlist paired &amp; unpaired laryngeal cartilages and identify their gross features.</p> <p>Enlist intrinsic &amp; extrinsic membranes of larynx identify their gross features &amp; formation of vestibular and vocal ligaments.</p>	SGD and dissection	MCQ/SAQ/OSPE Viva
22.	<b>External Ear</b>	Correlate the gross anatomy of external ear with relevant clinical conditions	<ul style="list-style-type: none"> <li>Describe the gross anatomical features of auricle, external auditory meatus and tympanic membrane.</li> <li>Correlate nerve supply of external ear and tympanic membrane with clinical significance (perforation of tympanic membrane)</li> <li>Justify the anatomical basis of otoscopy in infants and adults.</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva
23.	<b>Middle ear</b>	Correlate the gross anatomy of middle ear with relevant clinical conditions	<ul style="list-style-type: none"> <li>Describe the gross anatomical features, boundaries, structures</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>and contents of middle ear cavity.</p> <ul style="list-style-type: none"> <li>• Describe the structures forming the walls of middle ear cavity on the given model.</li> <li>• Highlight the importance of infection in middle ear cavity in relation to its communications.</li> <li>• Trace the pathway and distribution of facial nerve within petrous part of temporal bone.</li> </ul>		
24.	<b>Gross anatomy Inner ear</b>	List the parts of inner ear with their functions	identify the parts of bony and membranous parts of inner ear on model	SGD and dissection	MCQ/ SAQ/OSPE Viva
25.	<b>Facial nerve</b>	Correlate the anatomy of facial nerve with its lesions	<ul style="list-style-type: none"> <li>• Revisit the course and distribution of facial nerve</li> <li>• Revisit the relationship of facial nerve with pterygopalatine and submandibular ganglia</li> <li>• Revisit the effects of lesion of facial nerve at different levels</li> <li>• Differentiate anatomical basis of clinical presentation of UMN and LMN lesion of facial nerve</li> </ul>	LGIS	MCQ/ SAQ/OSPE Viva
26.	<b>Orbit</b>	Correlate the anatomy of orbital contents with relevant clinical significance.	<ul style="list-style-type: none"> <li>• Describe the skeletal framework of bony orbit and its communications</li> </ul>	SGD and dissection	MCQ/ SAQ/OSPE Viva

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<ul style="list-style-type: none"> <li>• List the contents of orbit</li> <li>• Identify the parts of eyeball on a model</li> <li>• Tabulate the attachments, nerve supply and actions of extraocular muscles</li> <li>• Justify the movements of extraocular muscles based on their attachments</li> <li>• Trace the course and distribution of 3, 4 and 6 CN.</li> <li>• Justify the peculiar Position of eyeball in case of lesion of 3, 4 and 6 CN</li> <li>• Trace the route and distribution of ciliary ganglion.</li> <li>• Describe the course and distribution of ophthalmic nerve</li> <li>• Name different components of lacrimal apparatus</li> <li>• Describe the nerve supply of Lacrimal gland</li> </ul>		
27.	<b>Cranial nerves</b>	Correlate the anatomy of each cranial nerve with their lesions	Revisit the course and distribution of all cranial nerves	SGD and dissection	MCQ/ SAQ/OSPE Viva
28.	<b>Radiography</b>	Identify the important bony landmarks in region of head and neck on x rays.	Identify the important bony landmarks of cervical vertebrae, paranasal sinuses, skull on x ray.	SGD and dissection	MCQ/ SAQ/OSPE Viva

29.	<b>Surface marking</b>	Mark the vital structures of head and neck on skin of a subject	<ul style="list-style-type: none"> <li>• Mark following structures on subject</li> <li>• Thyroid</li> <li>• Parotid Gland and duct</li> <li>• CCA</li> <li>• Common carotid artery</li> <li>• Facial artery</li> <li>• Vagus</li> <li>• Accessory</li> <li>• Hypoglossal</li> <li>• External jugular vein</li> <li>• Internal jugular vein</li> </ul>	SGD and dissection	MCQ/SAQ/OSPE Viva
-----	------------------------	---	---	--------------------	----------------------

<b>EMBRYOLOGY</b>				
<b>Topic/ Theme</b>	<b>Learning outcomes</b>	<b>Learning Objectives/ Contents</b>	<b>Instructional Strategies</b>	<b>Assessment Tools</b>
Integumentary System	Comprehend the embryological basis of congenital anomalies related to integumentary system.	<ul style="list-style-type: none"> <li>• Describe the development of skin, hair nails, mammary gland</li> <li>• Describe the embryological basis of relevant congenital anomalies (vitiligo, ichthyoses, hemangiomas and dermatoglyphics and mammary gland anomalies)</li> </ul>	Lectures/ SGD	MCQS/SAQS/SEQS/ Viva
Head and neck	Comprehend the embryological basis of congenital anomalies related to Pharyngeal Arches and pouches, tongue, nose and paranasal sinuses, face, palate thyroid and parathyroid glands	<ul style="list-style-type: none"> <li>• List embryological sources of head and neck structures</li> <li>• List components of pharyngeal apparatus.</li> <li>• Tabulate the nerve supply and derivatives of each arches, pouches, clefts and membranes</li> <li>• Describe the embryological basis of first arch syndrome and</li> </ul>		

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

		<p>its relation to cardiac anomalies</p> <ul style="list-style-type: none"> <li>• Correlate the normal development of tongue with its congenital anomalies</li> <li>• Correlate the normal development and descent of thyroid gland with its associated anomalies.</li> <li>• Justify the relative anatomical location of parathyroid gland</li> <li>• Outline the development of nose and paranasal sinuses</li> <li>• Enumerate the prominences of facial development</li> <li>• Elucidate the embryological phenomenon of development of face and palate</li> <li>• Correlate various facial and palatal clefts with normal development</li> </ul>		
--	--	---	--	--

Development of Eye	Correlate the developmental processes involved in formation of eye with relevant congenital anomalies	<ul style="list-style-type: none"> <li>• Describe the development of the optic cup</li> <li>• Relate the differentiation of wall of optic cup into definitive structures</li> <li>• Describe the differentiation of Mesenchyme in chambers of eye</li> <li>• Correlate the common congenital anomalies of eye with normal development.</li> <li>• Describe the development of various layers of eyeball.</li> </ul>		
Development of Ear	Correlate the developmental processes involved in formation of ear with relevant congenital anomalies.	<ul style="list-style-type: none"> <li>• Revisit the role of first and second pharyngeal apparatus in development of ear.</li> <li>• Describe the differentiation of otic capsule into inner ear</li> <li>• Correlate the anomalies of external ear with neural crest cells.</li> </ul>		

Sr. No.	Topic/theme	Learning outcomes	Course content/learning objectives	Instructional strategies	Assessment tool
<b>HISTOLOGY</b>					
<b>INTEGUMENTARY SYSTEM</b>					
1.	Skin/ Integumentary system	Appraise the various types of skin, their microstructure and the various skin appendages. Describe the histological basis of the various pathologies of skin and mammary gland	Describe the components of skin, its epithelium (including the various cells of epidermis along with their functions), nail, hair and mammary gland.	LGIS	MCQs, SAQs, SEQs, Viva voce
			Explain histological differences between thick and thin skin. Describe the various appendages of skin.		
			Describe the histological basis of psoriasis, vitiligo, albinism, blister disorders and cancers of skin.		
			Describe the differences in histological structure of mammary gland between inactive, active and lactating phase.		
			Describe the involution of mammary gland in old age.		
			Describe the histological basis of carcinoma of mammary gland (part of parenchyma mostly involved- intraductal carcinoma).		
			SKILL Identify an H&E stained slide of thick and thin skin and mammary gland (inactive and active phases) and draw their labelled diagrams.	Practical	OSPE
<b>UPPER GASTROINTESTINAL SYSTEM</b>					

2.	Lip & tongue	Appraise the light microscopic structure of lip and tongue, with special emphasis on	Describe the histological features of lip, with emphasis on transition in structure from	LGIS	MCQs, SAQs, SEQs, Viva voce
----	--------------	--	--	------	-----------------------------

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

Revised (V-II)

		papillae of tongue and taste buds.	cutaneous to vermillion to mucosal zone. Explain the histological features of dorsal and ventral surfaces of tongue, with particular focus on tongue papillae, their shape, location, keratinization, number and presence or absence of taste buds.		
			SKILL Identify an H&E stained slide of lip and tongue and draw their labelled diagrams.	Practical	OSPE
3.	Histology of salivary glands	Appraise the light microscopic structure of different major salivary glands.	Understand the classification of salivary glands on basis of morphology and nature of secretion. Describe the histomorphological features of salivary glands with regards to their secretory and ductal systems.	LGIS	MCQs, SAQs, SEQs, Viva voce
			SKILL Identify H&E stained slides of parotid gland, submandibular gland and sublingual glands and draw their labelled diagrams.	Practical	OSPE
			Identify the differentiating features seen in different parts of esophagus with special focus on differences between upper and lower ends of esophagus.		
			Identify and understand the changes taking place in the layers of gut as it transitions from esophagus to stomach.		

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p><b>SKILL</b> Identify H&amp;E stained slides of upper and lower ends of esophagus, and gastroesophageal junction and draw their labelled diagrams.</p>		
<b>ENDOCRINE SYSTEM</b>					
4.	Histology of pituitary gland	Describe the histological structure and hormones of different parts of pituitary gland to understand the basis of various hormonal disorders of pituitary gland.	Describe the various parts of pituitary gland.	LGIS	MCQs, SAQs, SEQs, Viva voce
			Identify and understand the cells forming the parenchyma of different parts of adenohypophysis, their staining characteristics, cellular features, and the hormones produced by them.		
			Describe the histological differences between adenohypophysis and neurohypophysis on the basis of embryological origin, and understand the concept of Herring bodies and the hormones contained within them.		
			<p><b>SKILL</b> Identify H&amp;E stained slide of pituitary gland draw its labelled diagram.</p>	Practical	OSPE
5.	Histology of Thyroid and parathyroid glands	Describe the histological structure and hormones of thyroid and parathyroid glands and correlate the hormonal disturbances with changes in blood calcium levels.	Describe the histological structure of thyroid gland as an endocrine gland, with special focus on structure of thyroid follicles, their lining epithelium, changes in the epithelium in different phases of activity of thyroid gland.	LGIS	MCQs, SAQs, SEQs, Viva voce
			Describe the parafollicular/C cells in thyroid gland.		

Revised (V-II)

			Describe the histological structure of parathyroid gland with focus on arrangement of cells, their staining characteristics, secretion, and the relationship between the effect of Parathyroid hormone and calcitonin on blood calcium levels.		
			SKILL Identify H&E stained slide of thyroid and parathyroid glands draw their labelled diagrams.	Practical	OSPE
			Identify and understand the parenchymal components of exocrine parts of pancreas (secretory and ductal parts).		
			Describe the histological features of islets of Langerhans and understand the staining characteristics and arrangement of cells forming the islets, with identification of different hormones released by the islets.		
			SKILL Identify H&E stained slide of pancreas and draw its labelled diagram.	Practical	OSPE
<b>HISTOLOGY OF SPECIAL SENSES</b>					
9.	Histology of Eye	Appraise the histological structure of different layers of eyeball.  Understand the histological basis of cataract, glaucoma,	Describe the detailed structure and function of sclera and cornea, with special emphasis on corneal transparency and its fusion with sclera at corneoscleral junction.	LGIS	MCQs, SAQs, SEQs, Viva voce



		retinal detachment and age-related macular degeneration.	Describe the light and ultramicroscopic structure of uveal tract, different layers of retina, correlating the arrangement of neuronal cells and processes with their functions.		
			Describe and correlate the gross anatomical structure of eyelid with its histological structure.		
			SKILL Identify H&E stained slide of cornea, eyelid, retina, choroid and sclera and draw their labelled diagrams.	Practical	OSPE
10.	Histology of ear	Appraise the histological structure of different parts of ear. Understand the basic histology and mechanism behind motion sickness and deafness.	Identify and understand the histological structure of different parts of ear, particularly the external and internal ear.	LGIS	MCQs, SAQs, SEQs, Viva voce
			Describe the histological structure of sensory receptor areas of internal ear like Organ of Corti, maculae acousticae and crista ampullaris.		
			Identify and understand the cells and spaces in cochlea.		
			SKILL Identify H&E stained slide of pinna and cochlea and draw their labelled diagrams.	Practical	OSPE

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

			<p>Understand and describe the microscopic and ultramicroscopic structure of testis, with special emphasis on structure of seminiferous tubules (structure and function of cells of the lining epithelium, including blood-testis barrier), intratesticular and extratesticular ductal system (epididymis, ductus deferens) and structure and functions of accessory male reproductive organs.</p> <p>Differentiate between the structures of epididymis and ductus deferens correlating with their functions.</p> <p>Understand and identify the histological structure of prostate gland in special reference to changes occurring in old age, benign prostatic hyperplasia, prostatic adenocarcinoma, and diagnostic role of Prostatic specific antigen (PSA). Understand the histological basis of changes occurring in testis in undescended testis and mumps.</p>		
			<p><b>SKILL</b> Identify H&amp;E stained slide of testis, epididymis, ductus deferens, seminal vesicles and prostate gland and draw their labelled diagrams</p>	Practical	OSPE

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

Practicals					
	<b>Histology</b>	1. Thick and thin skin 2. Mammary gland 3. Lip 4. Tongue 5. Salivary glands 6. Pituitary gland 7. Thyroid gland 8. Parathyroid gland 9. Cornea 10. Retina 11. Pinna			

PHYSIOLOGY					
S.No.	Topic/ Theme	Learning outcomes	Learning Objective/ Content	Instructional strategies	Assessment tool
<b>Special Senses</b>					
1	<b>Physiology of Eye</b>	Explain the physiology of eye and the visual pathway and appraise the pathophysiological basis of abnormalities related to eye.	Explain refraction and concept of convergence and divergence.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> <li>• Practical demonstration and performance</li> </ul>	MCQ/SAQ/SEQ/structured Viva/OSPE
			Define focal length, focal point and power of lens.		
			Differentiate between emmetropia, myopia, hyperopia, astigmatism, presbyopia and describe their treatment		
			Discuss the concept of reduced eye and depth perception.		
			Explain the process of its formation, circulation and regulation of aqueous humor.		
			Describe intraocular pressure and pathophysiology of glaucoma.		

			Describe accommodation reflex, light reflex and their pathway.		
			Describe physiological anatomy of retina		
			Explain rhodopsin visual cycle and role of vitamin A in night blindness.		
			Describe phototransduction in photoreceptors		
			Explain the mechanism of regulation of retinal sensitivity (light and dark adaptation).		
			Discuss and draw the visual pathway and its lesions		
			Explain the visual cortex and its functional units.		
			Describe the mechanism of different types of eye movements		
			Discuss pathophysiology of strabismus, Horner's syndrome and Argyll Robertson pupil.		
			Discuss the effects of sympathetic and parasympathetic innervation of eye.		
			Determine the visual acuity of the subject for far and near vision.		
			Demonstrate the field of vision of the subject.		
2	<b>Physiology of Ear</b>	Explain the physiology of ear and the auditory	Describe the physiological Anatomy of ear	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> </ul>	MCQ/SAQ/SEQ/structured Viva/OSPE

for MBBS year-II students

		pathway and the abnormalities related to ear.	<p>Explain the mechanism of conduction of sound waves through the ear to the cochlea</p> <p>Describe “Impedance Matching” and its importance</p> <p>Describe the process of attenuation of sounds</p> <p>Explain the Place Principle</p> <p>Describe the functions of Organ of Corti</p> <p>Explain the mechanism of determination of loudness</p> <p>Recall the auditory pathway</p> <p>Recognize the function of cerebral cortex in hearing</p> <p>Explain the process of determination of direction from which sound is coming</p> <p>Describe various hearing Abnormalities</p>	<ul style="list-style-type: none"> <li>• CBL</li> <li>• Practical demonstration and performance</li> </ul>	
3	<b>Physiology of taste</b>	Explain the physiology of taste sensation and its pathway.	<p>Describe the primary sensations of taste</p> <p>Describe the mechanism of stimulation of taste buds and the transmission of signals to CNS</p>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> <li>• Practical demonstration and performance</li> </ul>	MCQ/SAQ/SEQ/structured Viva/OSPE
4	<b>Physiology of olfaction</b>	Explain the physiology of olfaction and its visual pathway.	<p>Explain the physiological anatomy of olfactory membrane.</p> <p>Explain the mechanism of stimulation of olfactory cells.</p> <p>Identify the primary sensations of smell</p>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva



			Describe the transmission of signals of olfaction into the central nervous system		
<b>ENDOCRINOLOGY</b>					
5	<b>Basics of endocrinology</b>	Appraise the basic principles of endocrinology along with the functions and related abnormalities of various endocrine glands.	<ul style="list-style-type: none"> <li>• Appreciate the coordination of body functions by chemical messengers</li> <li>• Recall the chemical structure and synthesis of hormones</li> <li>• Explain the hormone secretion, transport, and clearance from the blood</li> <li>• Describe the feedback control of hormone secretion</li> <li>• Explain the transport of hormones in the blood and “clearance” of hormones from the blood</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva
6	<b>Mechanism of action of hormones</b>		<ul style="list-style-type: none"> <li>• Identify the various hormone receptors and their activation</li> <li>• Explain the mechanism of intracellular signaling after hormone receptor activation</li> <li>• Explain the second messenger mechanisms for mediating</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva

			<p>intracellular hormonal functions</p> <ul style="list-style-type: none"> <li>Identify the hormones that act mainly on the genetic machinery of the cell</li> </ul>		
7	<b>Hormones of hypothalamus and Pituitary gland</b>		<ul style="list-style-type: none"> <li>Explain the pituitary gland and its relation to the hypothalamus</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>SGD</li> <li>CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva
			<ul style="list-style-type: none"> <li>Summarize the hypothalamic-hypophysial portal blood vessels of the anterior pituitary gland and its significance</li> <li>Recall the functions and regulation of growth hormone</li> <li>Differentiate between hypopituitarism and hyperpituitarism and its pathophysiological basis</li> <li>Explain the posterior pituitary gland and its relation to the hypothalamus</li> <li>Describe the physiological functions of ADH and oxytocin Hormone</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>SGD</li> <li>CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva
8	<b>Thyroid gland</b>		<ul style="list-style-type: none"> <li>Recall the synthesis and secretion of the thyroid hormone</li> </ul>	<ul style="list-style-type: none"> <li>Lectures</li> <li>SGD</li> <li>CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva

			<ul style="list-style-type: none"> <li>• Explain the functions of the thyroid hormone</li> <li>• Summarize the regulation of thyroid hormone secretion</li> <li>• Identify the disorders of the Thyroid gland and their pathophysiological basis</li> </ul>		
9	<b>Calcium regulating hormones</b>		<ul style="list-style-type: none"> <li>• Explain the regulation of calcium and phosphate in the extracellular fluid and plasma</li> <li>• Enlist the actions of vitamin D</li> <li>• Explain the effect of parathyroid hormone on calcium and phosphate concentrations in the extracellular fluid</li> <li>• Summarize the control of parathyroid secretion by calcium ion concentration</li> <li>• Describe the actions of calcitonin</li> <li>• Explain the pathophysiology of parathyroid hormone, vitamin D, and bone diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva

10	<b>Hormones of adrenal cortex</b>		<ul style="list-style-type: none"> <li>• Explain synthesis and secretion of adrenocortical hormones</li> <li>• Enlist the functions of aldosterone</li> <li>• Enlist functions of the glucocorticoids</li> <li>• Describe the disorders of adrenocortical secretion and their pathophysiological basis</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva
11	<b>Hormones of pancreas</b>		<ul style="list-style-type: none"> <li>• Summarize the metabolic effects of insulin</li> <li>• Explain the mechanisms of insulin secretion</li> <li>• Explain the control of insulin secretion</li> <li>• Describe functions of Glucagon</li> <li>• Summarize the regulation of glucagon secretion</li> <li>• Describe the types and pathophysiology of diabetes mellitus</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva
<b>REPRODUCTIVE SYSTEM</b>					
12	<b>Male reproductive physiology</b>	Describe the male reproductive functions and related abnormalities.	<ul style="list-style-type: none"> <li>• Explain the functional anatomy of the male reproductive organs</li> <li>• Describe the process of spermatogenesis</li> <li>• Explain the function of the seminal</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• CBL</li> </ul>	MCQ/SAQ/SEQ/structured Viva

			<p>vesicles and prostate gland</p> <ul style="list-style-type: none"> <li>• Explain the abnormalities of spermatogenesis and male fertility and their pathophysiological basis</li> <li>• Describe the secretion and functions of testosterone and feedback loop regulating its secretion.</li> </ul>		
13	<b>Female reproductive system</b>	Describe the female reproductive functions and the related abnormalities.	<ul style="list-style-type: none"> <li>• Summarize the functional anatomy of the female sexual organs</li> <li>• Enlist the ovarian hormones</li> <li>• Describe the functions of estrogen and progesterone</li> <li>• Explain the monthly ovarian cycle and the role of the gonadotropic hormones</li> <li>• Summarize the regulation of the female monthly rhythm and the interplay between the ovarian and hypothalamic-pituitary hormones in the feedback regulation of monthly ovarian cycle</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• PBL/CBL</li> </ul>	MCQ/SAQ/SEQ/ Viva

			<ul style="list-style-type: none"> <li>• Explain puberty and menarche and menopause</li> </ul>		
14	<b>Pregnancy</b>	Appreciate the physiological phenomenon underlying pregnancy, parturition and lactation	<ul style="list-style-type: none"> <li>• Describe maturation and fertilization of the ovum</li> <li>• Explain the process of transport of the fertilized ovum in the fallopian tube</li> <li>• Describe the implantation of the blastocyst in the uterus and early nutrition of the embryo</li> <li>• Summarize the response of the mother's body to pregnancy</li> <li>• Explain the changes in the maternal circulatory system during pregnancy</li> <li>• Explain the role of human chorionic gonadotropin in pregnancy</li> <li>• Describe the placental hormones and their significance</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• PBL/CBL</li> </ul>	MCQ/SAQ/SEQ/ Viva
15	<b>Parturition &amp; Lactation</b>		<ul style="list-style-type: none"> <li>• Explain parturition and onset of labor and the hormones regulating it</li> <li>• Explain the mechanism of lactation and the hormones regulating it</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• PBL/CBL</li> </ul>	MCQ/SAQ/SEQ/ Viva

16	<b>Neonatal physiology</b>	Appreciate the physiological basis of fetal growth and neonatal adjustment to extra-uterine life	<ul style="list-style-type: none"> <li>• Summarize the growth and functional development of the fetus</li> <li>• Explain the adjustments of the infant to extra-uterine life</li> <li>• Describe circulatory readjustments at birth</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• SGD</li> <li>• PBL/CBL</li> </ul>	MCQ/SAQ/SEQ/Viva
----	----------------------------	--	--	--	------------------

### Practicals

1.	<b>Practicals</b>	Perform Perimetry and map the visual fields on an SP		Practical	OSPE
2.		Check visual acuity (far & near vision) on an SP using Snellen's and jaeger's chart			
3.		Check the color vision of an SP Ishihara chart			
4.		Examine the 1 <sup>st</sup> – 6 <sup>th</sup> Cranial nerves on an SP			
5.		Examine the 7 <sup>th</sup> – 12 <sup>th</sup> Cranial nerves on an SP			
6.		Demonstration of reflexes of the Eye			
7.		Perform hearing test to check the hearing in an SP			
8.		Perform pregnancy test by urinary dipstick method			

<b>BIOCHEMISTRY</b>					
S.No.	Topic/ Theme	Learning outcomes	Learning Objective/ Content	Instructional strategies	Assessment tool

1	<b>Biochemistry of Endocrine System</b>	Appraise the basic principles of endocrinology along with the biochemical basis and related abnormalities	<ul style="list-style-type: none"> <li>➤ Describe the general principles of endocrine system</li> <li>➤ Classify the hormones according to their chemical nature &amp; Mechanism of Action</li> <li>➤ Explain Cell surface receptors with special emphasis on G protein coupled receptors</li> <li>➤ Discuss Intracellular second messenger signaling cascade</li> <li>➤ Describe the Intracellular ligand receptors</li> <li>➤ Explain the Site of synthesis, stimulus for secretion, mechanism of action, receptors, intracellular effects, target cells, tissues and biochemical role &amp; hypo/hyper secretion of Growth Hormone</li> <li>➤ Explain the Site of synthesis, stimulus for secretion, mechanism of action, receptors, intracellular effects, target cells, tissues and biochemical role &amp; hypo/hyper secretion of Thyroid hormone</li> <li>➤ Explain the Site of synthesis, stimulus for secretion, mechanism of action, receptors, intracellular effects, target cells, tissues and biochemical role &amp; hypo/hyper secretion adrenal hormones</li> <li>➤ Explain the Site of synthesis, stimulus for</li> </ul>	<ul style="list-style-type: none"> <li>➤ LECTURES</li> <li>➤ SGD</li> <li>➤ PBL</li> <li>➤ CBL</li> </ul>	<ul style="list-style-type: none"> <li>➤ MCQ</li> <li>➤ SAQ/SEQ</li> </ul>
---	---	---	---	---	--

			<p>secretion, mechanism of action, receptors, intracellular effects, target cells, tissues and biochemical role &amp; hypo/hyper secretion Androgens &amp; Estrogens.</p> <ul style="list-style-type: none"> <li>➤ Describe the Site of synthesis, stimulus for secretion, mechanism of action, receptors, intracellular effects, target cells, tissues and biochemical role &amp; hypo/hyper secretion pancreatic hormones</li> <li>➤ Explain the Site of synthesis, stimulus for secretion, mechanism of action, receptors, intracellular effects, target cells, tissues and biochemical role &amp; hypo/hyper secretion of parathyroid hormone</li> </ul>		
2	<b>Integration and regulation of Metabolic Pathways in Different Tissues</b>	Compare the role of different body organs in integration of metabolism in health and disease	<ul style="list-style-type: none"> <li>➤ Discuss regulatory effects of Insulin and Glucagon on CHO metabolism.</li> <li>➤ Describe the regulation of Blood Glucose in human body</li> <li>➤ Explain Hyperglycemia, hypoglycemia and their regulating factors</li> <li>➤ Describe the Diabetes Mellitus, its Laboratory findings, Diagnosis and biochemical complications</li> <li>➤ Describe Feed fast cycle and explain its</li> </ul>	<ul style="list-style-type: none"> <li>➤ LECTURES</li> <li>➤ SGD</li> <li>➤ PBL</li> <li>➤ CBL</li> </ul>	<ul style="list-style-type: none"> <li>➤ MCQ</li> <li>➤ SAQ/SEQ</li> </ul>

			<p>adaptation by different tissues to changing energy conditions of the body</p> <ul style="list-style-type: none"> <li>➤ Describe the Integration and regulation of Metabolic Pathways in Different Tissues</li> <li>➤ Discuss general principles of endocrine system</li> <li>➤ Comprehend Biosynthesis of hormones</li> <li>➤ Discuss regulation of Secretion</li> <li>➤ Classify hormones according to their chemical nature &amp; receptor availability</li> <li>➤ Describe mechanism of action of Hormones</li> <li>➤ Discuss <ul style="list-style-type: none"> <li>• Cell surface receptors G protein coupled receptors</li> <li>• Intracellular second messenger signaling cascade</li> <li>• Intracellular ligand receptors</li> <li>• Biochemical Functions of Growth Hormone</li> <li>• Synthesis &amp; Biochemical Functions of Thyroid hormone</li> <li>• Biochemical Functions of adrenal hormones</li> <li>• Androgens synthesis and Biochemical functions</li> <li>• Estrogens synthesis and Biochemical functions</li> </ul> </li> </ul>		
--	--	--	--	--	--

			<ul style="list-style-type: none"> <li>• Biochemical Functions of pancreatic hormones</li> <li>• Biochemical Functions of parathyroid hormones</li> <li>• Disorders of hypo/hyper secretion of hormones</li> </ul>		
3	<b>Nutrition</b>	<ul style="list-style-type: none"> <li>➤ Appraise the nutritional requirements of each food constituent for better understanding of relevant disorders</li> <li>➤ Outline nutritional requirement in different commonly occurring disorders</li> <li>➤ Review hazards of under and over nutrition</li> </ul>	<ul style="list-style-type: none"> <li>➤ Give the caloric requirements of the human body</li> <li>➤ Define Balanced Diet and elaborate various DRIs (EAR, DA, AI, UL), AMDR</li> <li>➤ Explain the nutritional requirements in Pregnancy, Lactation, new-born and in nutritional disorders, hypertension, diabetes, cirrhosis, end stage renal disease</li> <li>➤ Describe Protein turnover, amino acid Pool, Nitrogen Balance, BMR, BMI, Respiratory quotient, Protein Quality and Glycemic Index.</li> <li>➤ Describe the nutritional requirement and biomedical importance of CHO, lipid &amp; protein in human body</li> <li>➤ Define Malnutrition. Discuss Protein energy Malnutrition in particular.</li> <li>➤ Compare and contrast between Marasmus and Kwashiorkor</li> </ul>	<ul style="list-style-type: none"> <li>➤ LECTURES</li> <li>➤ SGD</li> <li>➤ PBL</li> <li>➤ CBL</li> </ul>	<ul style="list-style-type: none"> <li>➤ MCQ</li> <li>➤ SAQ/SEQ</li> </ul>

4	<b>Practicals</b>	Perform and interpret the results of given examination	<ul style="list-style-type: none"> <li>➤ Oral Glucose Tolerance Test &amp; its clinical interpretations</li> <li>➤ Estimation and clinical interpretation of plasma enzyme LDH</li> <li>➤ Estimation and clinical interpretation of plasma enzyme ALT</li> <li>➤ Estimation of plasma enzyme ALP and clinical interpretation</li> <li>➤ Estimation and clinical interpretation of plasma enzyme AST</li> </ul>	Practical	OSPE
---	-------------------	--	--	-----------	------

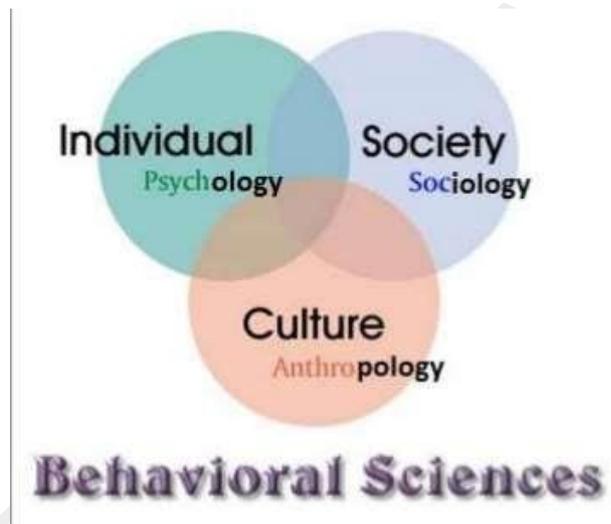
Revised (V-III)

Medicine	Block III (2 <sup>nd</sup> Year)	Endocrine (10 Weeks) Special Senses (2 Weeks)			
S.No.	Topic/ Theme	Learning outcomes	Learning Objectives/ Content	Instructional strategies	Assessment tool
1.	<b>Hyper and hypothyroidism</b>	Relate the relevant basic knowledge with clinical presentations	<ul style="list-style-type: none"> <li>• Demonstrate understanding of basic concepts</li> <li>• Justify the clinical presentation with reasoning</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
2.	<b>Obesity</b>				
3.	<b>Diabetes Mellitus</b>				
4.	<b>Parathyroid Diseases</b>				
5.	<b>Adrenal Disorders</b>				
6.	<b>Infertility</b>				
7.	<b>Errors of Refraction</b>				
8.	<b>Deafness</b>				
9.	<b>Clinical Nutrition (TPN)</b>				
10.	<b>Protein Energy Malnutrition</b>				

Surgery					
Head and Neck					
S.No	Topics	Learning Outcomes	Learning objectives	MIT	Assessment tool
		By the end of session, student should be able to:			
1.	<b>Face trauma</b>	Relate the relevant basic knowledge with clinical presentations	<ul style="list-style-type: none"> <li>• Demonstrate understanding of basic concepts</li> <li>• Justify the clinical presentation with reasoning</li> </ul>	LGIS	MCQ SEQ SAQ Viva Voce
2.	<b>Danger area of face</b>				
3.	<b>Impacted stones in salivary glands</b>				
4.	<b>Freys syndrome</b>				
5.	<b>Epistaxis</b>				
6.	<b>Scalp injuries</b>				
7.	<b>Fracture base of skull</b>				

<b>Research Methodology</b>					
<b>S.No</b>	<b>Topic/ Theme</b>	<b>Learning Outcomes</b>	<b>Learning Objectives/Contents</b>	<b>Instructional strategies</b>	<b>Assessment Tool</b>
1.	<b>Data collection method</b>	<ul style="list-style-type: none"> <li>Formulate research questionnaire</li> <li>Develop tool/ procedure for data collection</li> </ul>	Data collection procedure Study questionnaire Interview	LGIS/ SGD	MCQ/ SEQ
2.	<b>Descriptive data analyses</b>	Enter data and do descriptive data analysis on SPSS	Introduction to SPSS data entry and analyses software, data frequency tables, graphs, charts	workshop	MCQ/ SEQ
3.	<b>Statistical Data analyses,</b>	Apply basic state tests on the research data	Parametric tests Non -parametric tests	Statistical Data analyses,	Able to do descriptive f data analysis SPSS Apply basic state tests
4.	<b>Proposal writing</b>	Prepare a research proposal	Introduction, Objectives Hypothesis methodology, Statistical analysis	Group assignment	Internal assessment by community dept

# Behavioural Sciences Curriculum For MBBS/BDS year II



## Course Outline

Learning Outcomes	Learning Objectives/Content	Instructional Strategies	Assessment Tool	Who will teach
<b>PSYCHOLOGY (10 hours)</b>				
Enhance doctor's own learning and clinical skills	Define sensation and sense organs, perception and factors influencing perception, attention and concentration, memory and its types, thinking, cognition and cognitive levels and learning and its type for doctors own learning and clinical skills. [1]	LGIS/ Role Modelling/CBL	Quiz/MCQs	<b>First Priority:</b> Psychologist <b>Second Priority</b> Behavioural Scientist
Identify factors affecting Personality development	Discuss human development of personality (5), significance of IQ and EQ in clinical practice of doctor. [1,2,3,4]	SGD/ Modelling? Mentoring	Quiz/Poster Presentation	<b>First Priority:</b> Psychologist <b>Second Priority</b> Behavioural Scientist
Integrate the principles of medical ethics in professional life	<b>Reproductive Ethics</b> <ul style="list-style-type: none"> <li>• Define the terms "in-vitro fertilization" and "surrogacy"</li> <li>• Outline the potential ethical issues related to surrogacy</li> <li>• Discuss the implications of surrogacy from social, moral, legal and religious perspectives [50]</li> </ul>	LGIS/SGD	Presentations/ Case study/ Reports/Portfolio	<b>First Priority:</b> Psychologist <b>Second Priority</b> Behavioural Scientist

<p>Understand the complex interplay of Brain and Behaviour</p>	<ul style="list-style-type: none"> <li>• Discuss the role of neurotransmitters in mental disorders</li> <li>• To understand the biopsychology of motivation, emotion, language, learning and associated disorder [53]</li> </ul>	<p>Video reflections/Case examples/Article reading/LGIS</p>	<p>Quizzes/Assignments/Presentations/Articles reflections</p>	<p><b>First Priority:</b> Psychologist <b>Second Priority</b> Behavioural Scientist</p>
--	--	---	---	---

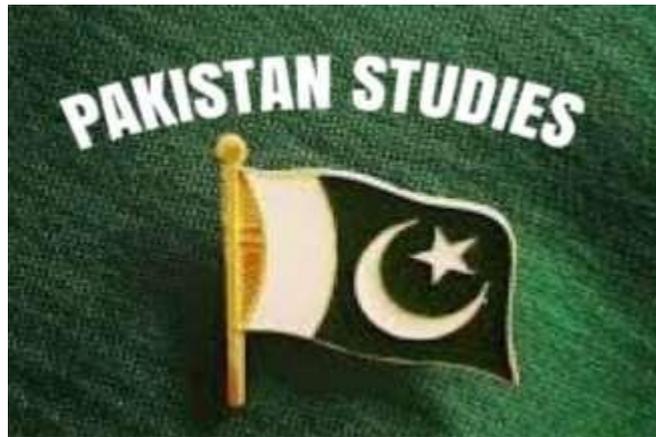
Revised (V-II)

<b>ANTHROPOLOGY (10 hrs)</b>				
Equip medical students with required social skills along with clinical competencies to deal with vulnerable population	<b>Vulnerable Population</b> Demonstrate understanding of gender and social construction of masculinity and femininity, societal attitudes towards children and elderly while dealing with patients [25,26,27]	Interactive lectures/team-based learning, flipped classroom, critical discussions, group projects/presentations, role-plays, seminars, design thinking (case-method), Journal club, tutorials, ethnographic films, tutorials, written assignments	Quiz/Presentation/Assignment/OSCE/Case study	<b>First Priority:</b> Anthropologist <b>Second Priority:</b> Behavioural Scientist
Critique perplexing ethical problems and their mitigation.	<b>HIV and sexually transmitted diseases</b> <ul style="list-style-type: none"> <li>• Discuss the term “stigma” and “social discrimination”</li> <li>• Recognize the role of a healthcare provider in protecting their patients from stigma and social discrimination</li> <li>• Discuss the potential issues and implications of screening from social and moral perspectives. [50]</li> </ul>	LGIS/SGD	Assignment/Presentation/MCQs	<b>First Priority:</b> Anthropologist <b>Second Priority:</b> Behavioural Scientist
Identify social organization of health care systems as a product of socio-political, economic, and cultural	<b>Medical Pluralism</b> <ul style="list-style-type: none"> <li>• Discuss popular, professional and folk sector of health in various cultures and societies.</li> <li>• Identify routes patient take</li> </ul>	Interactive lectures/team based learning, flipped classroom, critical discussions, group projects/presentations, role-plays, seminars, design thinking (case-method), Journal club,	Quiz/Presentation/Assignment/OSCE/Case study	<b>First Priority:</b> Anthropologist <b>Second Priority:</b> Behavioural Scientist

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

processes(not as a separate entity)	before reaching a doctor in our society. (Ethno medicine) [27,28,29,30,31,32,33]	tutorials, ethnographic films, tutorials, written assignments.		
<b>SOCIOLOGY (10 hours)</b>				
<ul style="list-style-type: none"> <li>Interpret the key concepts of economics within the context of the health system</li> <li>Debate the relative merits of equity considerations in setting priorities for a health system</li> </ul>	<ul style="list-style-type: none"> <li>Discuss macro level policies and economic planning of health</li> <li>Discuss demographic and economic factors influencing health [38,39,40,41]</li> </ul>	Interactive lectures/ team based learning, flipped classroom, critical discussions, group projects/ presentations, tutorials, written assignments	Quiz/Presentation/ Assignment/ OSCE/Case study	<b>First Priority:</b> Sociologist <b>Second Priority:</b> Behavioural Scientist
Outline knowledge of diverse approaches in research on relevant health issues	Classify research methodology (qualitative and quantitative methods and their subtypes) [42,43,44,45]	Interactive lectures/ team based learning, flipped classroom, critical discussions, group projects/presentations, role-plays, seminars, design thinking (case-method), Journal club, tutorials, ethnographic films, tutorials, written assignments	Quiz/Presentation/ Assignment/ OSCE/Case study	<b>First Priority:</b> Sociologist <b>Second Priority:</b> Behavioural Scientist

# Pakistan Studies



*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

## Course Content of Pakistan Studies

1. **Scope** To impart basic concept of ideology of Pakistan with reference to historical backdrop of Muslims' struggle for the establishment of Pakistan, importance of Pakistan's geographical and strategic position and its relations with other countries.
2. **Course Objectives.** To enable the students to:
  - a. To develop the sense of belongingness to their motherland
  - b. To develop strong faith in the basic concepts of ideology of Pakistan and its historical background.
  - c. To aware about the historical background of Muslims' struggle in the making of Pakistan.
  - c. To sensitize students about the importance of Pakistan's geographical and strategic position in South Asia.
  - d. To aware the students with the meaning and significance of Pakistan's foreign policy.
  - e. To promote the knowledge of Pakistani culture and civilization.
  - f. To aware new generation about the current affairs and important pillars of Pakistan's political system.
  - g. To develop the qualities of patriot Pakistani for understanding and full filling their duties and responsibilities.
3. **Course Outcome.** On completion of the course, the students will be able to:
  - a. Develop the sense of belongingness to their motherland.
  - b. Apply knowledge of the historical background of Muslims' struggle in the making of Pakistan.
  - c. Understand about the importance of Pakistan's geographical and strategic position in South Asia.
  - d. Know the meaning and significance of Pakistan's foreign policy.
  - e. Develop the qualities of patriot Pakistani for understanding and full filling their duties and responsibilities.

#### 4. **Course Contents**

Serial	Chapter/Topic
<b>Basic Concept for Establishment of Pakistan</b>	
1	Introduction to Pakistan Studies
2	Ideology, Aims and Objectives for the establishment of Pakistan
3	Historical, Geo-political and Socio-cultural Background of Pakistan
<b>Role of Muslim Reformers</b>	
4	Hazrat Mujadid Alf Sani

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

5	Hazrat Shah Wali Ullah Muhadis Delhvi
6	Syed Ahmed Shaheed Barailvi
7	Sir Syed Ahmad Khan
<b>Muslim Political Struggle</b>	
8	Legislative Council Act - 1816, Indian Council Act - 1892, Hindi Urdu Controversy, Partition of Bengal, Simla Deputation.
9	Formation of All India Muslim League, Minto-Morley Reforms, Lucknow Pact - 1916, Montague-Chelmsford Reforms.
10	Khilafat Movement
<b>Pakistan Movement</b>	
11	Two Nation Theory
12	Problems of Indian Independence and the Muslims, Change in Muslim Politics, Delhi Proposal, Simon Commission, Nehru Report, Fourteen Points of Quaid e Azam, Allama Iqbal's Residential Address at Allahabad, Round Table Conference, Communal Awards, Government of India Act - 1935, Elections - 1937.
13	Role of Muslim League during Congress Rule.
14	Chaudhry Rehmat Ali and Pakistan Movement, Pakistan Kesoiunon, August urrer, onpps Mission, uun inaiia Movement, Gandhi-Jinnah Talks, Wavell Plan.
15	Simla Conference, Cabinet Mission Plan, Formation of Interim Government, June 3 Plan, Radcliffe Award, Independence Act 1937.
<b>Establishment of Pakistan</b>	
16	Initial Difficulties and Important Events
17	The Constitution of 1956, The Constitution of 1973
18	The Land of Pakistan - Geography
19	Natural Resources of Pakistan
20	Foreign Policy of Pakistan
21	Pakistan and the Muslim World
22	The Kashmir Problem

## 5. Reference/Text Books

### a. Essential Readings

- (1) "Pakistan Studies" by Ikram Rabbani, Carvan Book House, Lahore.
- (2) "Pakistan Studies" by Dr Zafar, Aziz Book Depot, Lahore.
- (3) "Mutala e Pakistan (Lazmi), Allama Iqbal Open University, Umar Printing Press, Lahore.
- (4) "Essential Book of Pakistan Studies" by Dr Rashid Ahmad Khan.
- (5) "Oxford Atlas of Pakistan".

# **TABLE OF SPECIATION**

## **2<sup>nd</sup> YEAR MBBS**

- **Anatomy**
- **Physiology**
- **Biochemistry**
- **Islamiat & Pakistan Studies**

## Second Professional MBBS Examination (2021)

### ANATOMY

#### Table of Specifications for Annual 2<sup>nd</sup> Professional Examination: Theory

**Time Allowed** =03 hrs. (Including MCQs)

**Marks of theory paper** =80

**Internal assessment** =20

**Total marks** =100

**Pass Marks** =50

#### **Paper-1**

40 x MCQs (40 Marks) Time =50 min

#### **Paper-2**

**Q. No. 1,2,3,4,5,6,7,8**

**4x SAQs/SEQs (Recall) = 05 marks each**

**4x SAQs/SEQs (Application) = 05 marks each**

**Total Marks = 40 Marks Time = 2 hours & 10 min**

S.No	Topic	NUMBER OF MCQs (40) Recall: 20 Application: 20 1 mark each	NUMBER OF SAQs/SEQs (08) 05 marks each	
			Recall	Application
1.	Special Embryology	08	-	01
2.	Special Histology	08	01	-
3.	Abdomen Pelvis & Perineum	09	01	01
4.	Head and neck	09	01	01
5.	Brain & Neuro Anatomy	08	01	01
<b>Total</b>		<b>40 (40 Marks)</b>	<b>04 (20 Marks)</b>	<b>04 (20 Marks)</b>
			<b>08 (40 Marks)</b>	

**PS SEQ of application level each year can be given from upper limb, lower limb or thorax**

**\*Clinical application of Anatomy(surgery) will be asked through application level Questions**

### Theory: Internal Assessment (IA) Calculation (20 Marks)

Exams	Weightings	Exams	Percentage
End of Block & Pre- annual Exams	80%	End of Block Exam – I	20
		End of Block Exam – II	20
		End of Block Exam- III	20
		Pre-Annual Exam	20
Modular/ Class Performance	20%	Modular/ Class Tests	20
<b>Total</b>	<b>100%</b>		<b>100%</b>

### Table of Specifications for Annual Professional Exam: Practical

Sr #	Topics	VIVA 40 Marks	OSPE 38 Marks Gross, Embryo, Radiology 02 mark / Station Histology 1 mark /station		Histology Manual	Grand Total/ Component
			Station (unobserved) 26 Marks	Observed Stations 15 Marks		
1	Special embryology	10	01 (02 marks)	-		<b>12</b>
2	Special histology	-	10 (10 marks)	9 marks (long slides)	02 marks	<b>21</b>
3	Abdomen Pelvis & Perineum	10	02 (04 marks)	Surface Marking 1 mark		<b>15</b>
4	Head and neck	10	02 (04 marks)	1 mark		<b>15</b>
5	Brain & Neuro Anatomy	10	02 (04 marks)			<b>14</b>
6	Radiology	-	01 (02 marks)	1 mark		<b>03</b>
<b>Total</b>		<b>40 Marks</b>	<b>18 (26 Marks)</b>	<b>12 Marks</b>	<b>02 Marks</b>	<b>80 Marks</b>

### Practical: Internal Assessment Calculation (20 Marks)

Exams	Weightings	Exams	Percentage
End of Block & Pre- annual Exams	80%	End of Block Practical/OSPE I	20
		End of Block Practical/OSPE II	20
		End of Block Practical/OSPE III	20
		Pre-Annual Exam	20
Class Performance	20%	*SGD/ CBL/ PBL/ Practical	20
<b>Total</b>	<b>100%</b>		<b>100%</b>

- **CBL/Assignments /Gross Sketch copies are part of Formative Assessment**
  - \* SGD= Small Group Discussion
  - CBL= Case Based Learning
  - PBL= Problem Based Learning

*Revised curriculum (V-II) applicable for MBBS year-II students 2021 onwards*

## Second Professional MBBS Examination (2021)

### PHYSIOLOGY

#### Table of Specifications for Annual 2<sup>nd</sup> Professional Examination: Theory

Time Allowed	=03 hrs. (Including MCQs)	
Marks of theory paper	=80	
Internal assessment	=20	
Total marks	=100	
Pass Marks	=50	
45 x MCQs	(40 Marks)	Time =50 min
Q. No. 1,2,3,4,5,6,7,8		
6 x SAQs/SEQs (Recall)	= 05 marks each	
2 x SAQs/SEQs (Application)	=05marks each	
Total Marks	= 40 Marks	Time = 2 hours & 10 min

S No	Topic	NUMBER OF MCQs (40) Recall: 16 Application: 24 1 mark each		NUMBER OF SAQs/SEQs (08) 05 marks each	
		Recall	Application	6x Recall	2x Application
1	GIT+ Renal Physiology	4	6	01	Any 2 from Whole Course
2	Neurosciences	5	9	02	
3	Special Senses	3	5	01	
4	Endocrine + Reproduction	4	4	02	
		<b>16</b>	<b>24</b>	<b>08 (40 Marks)</b>	
		<b>40 (40 marks)</b>			

#### Theory: Internal Assessment (IA) Calculation (20 Marks)

Exams	Weightings	Exams	Percentage
<b>End of Block &amp; Pre- annual Exams</b>	80%	End of Block Exam – I	20
		End of Block Exam – II	20
		End of Block Exam- III	20
		Pre-Annual Exam	20
<b>Modular/ Class Performance</b>	20%	Modular/ Class Tests	20
<b>Total</b>	<b>100%</b>		<b>100%</b>

## Table of Specifications for Annual Professional Exam: Practical

Viva (Theory) 40 marks		Practical/OSPE 40 marks			Total
Internal Examiner	External Examiner	OSPE (35)		Practical Journal	
		Observed	Unobserved		
<b>20</b>	<b>20</b>	<b>25</b>	<b>10</b>	<b>05</b>	<b>80</b>

**\*Number of observed stations are on the discretion of internal examiners but a minimum of three stations must be kept**

<b>Example: - 1</b> Marks= 25 Maximum Stations = 5 Time per stations= 5 mins Total Time= 25 Minutes	<b>Example: - 2</b> Marks =25 Stations = 3 Marks/ Stations= 8+8+9 Time / Stations= 8 Minutes
---	--

### Practical: Internal Assessment Calculation (20 Marks)

Exams	Weightings	Exams	Percentage
<b>End of Block &amp; Pre- annual Exams</b>	80%	End of Block Practical/OSPE I	20
		End of Block Practical/OSPE II	20
		End of Block Practical/OSPE III	20
		Pre-Annual Exam	20
<b>Class Performance</b>	20%	*SGD/ CBL/ PBL/ Practical	20
<b>Total</b>	<b>100%</b>		<b>100%</b>

\* SGD= Small Group Discussion  
 CBL= Case Based Learning  
 PBL= Problem Based Learning

**Second Professional MBBS Examination (2021)**

**BIOCHEMISTRY**

**Time Allowed** =03 hrs (Including MCQs)

**Marks of theory paper** =80

**Internal assessment** =20

**Total marks** =100

**Pass Marks** =50

**40 x MCQs (on separate sheet) (40 Marks) Time =50 min**

**Q. No. 1,2,3,4,5,6,7,8,9**

**7x SAQs/SEQs (Recall) = 04 marks each**

**2x SAQs/SEQs (Application) = 06 marks each**

**Total Marks =40 Marks Time = 2 hours & 10 min**

S. No	Topic	NUMBER OF MCQs (40) (Recall =17) (Application=23) 01 marks each	7x SAQs/SEQs (Recall) 04 marks each	2x SAQs/SEQs (Application) 06 marks each
1.	Biochemistry of Digestive Tract + Nutrition	08	1.5	Any 2 from whole Course
2.	Chemistry of Carbohydrates + Metabolism of Carbohydrates	08	1.5	
3.	Biochemistry of Endocrine System + Neurotransmitters	06	01	
4.	Biochemical Genetics + Molecular Biology Techniques	06	01	
5.	Bioenergetics & Biological Oxidation+ Integration of metabolism + Xenobiotic+ Cancer Metabolism	06	01	
6.	Nucleotide Chemistry + Nucleotide Metabolism + Body Fluids + Water & Electrolyte, Acid Base Balance	06	01	
	<b>Total</b>	<b>40 (40 Marks)</b>	<b>7 (28 Marks)</b>	<b>2 (12 Marks)</b>
			<b>09 (40 Marks)</b>	

**Theory: Internal Assessment (IA) Calculation (20 Marks)**

Exams	Weightings	Exams	Percentage
End of Block & Pre- annual Exams	80%	End of Block Exam – I	20
		End of Block Exam – II	20
		End of Block Exam- III	20
		Pre-Annual Exam	20
Modular/ Class Performance	20%	Class Tests	20
<b>Total</b>	<b>100%</b>		<b>100%</b>

**Table of Specifications for Annual Professional Exam –Practical**

Viva (Theory) 40 marks		Practical/OSPE 40 marks				Total
Internal Examiner	External Examiner	OSPE (20)		Viva + Performance	Journal	
		Observed (2 Station)	Unobserved (10 Station)			
<b>20</b>	<b>20</b>	<b>10</b>	<b>10</b>	<b>15</b>	<b>5</b>	<b>80</b>

**Practical: Internal Assessment Calculation (20 Marks)**

Exams	Weightings	Exams	Percentage
End of Block & Pre- annual Exams	80%	End of Block Practical/OSPE I	20
		End of Block Practical/OSPE II	20
		End of Block Practical/OSPE III	20
		Pre-Annual Exam	20
Class Performance	20%	*SGD/ CBL/ PBL/ Practical	20
<b>Total</b>	<b>100%</b>		<b>100%</b>

- \* SGD= Small Group Discussion  
 CBL= Case Based Learning  
 PBL= Problem Based Learning

## Second Professional MBBS Examination (2021)

### ISLAMIAT

#### Division of Marks (Total Marks 50)

##### a. Paper

Serial	Chapter/Topic	Marks Division	
		MCQs	SEQs
1	The Holy Quran & Sayings of the Holy Prophet (PBUH) (Selected Ayaat and Ahadees) (two SEQs)	-	20
2	Arkaan-e-Islam & Basic Beliefs (Tauheed, Risalat, Aakhirat, Prayer, Fasting, Haj, Jihad) (one SEQ)	4	5
3	Seerat-e-Nabi (PBUH) & Fazaal-e-Ikhlaaq (makarim-e-ikhlaaq, seerat, last sermon) (one SEQ)	4	5
4	Medical Profession – Significance and Importance (concept of disease in Islam, health, nursing profession, qualities of a doctor, treating a patient etc) (one SEQ)	2	5
<b>Total Marks</b>		<b>10</b>	<b>35</b>
<ul style="list-style-type: none"><li>• First question will be Objective Type (MCQs), carrying 10 Marks.</li><li>• Five SEQs (two will carry 10 Marks each; three SEQs each carrying 5 Marks)</li></ul>			

b. **Class Participation/ Assignments:** 5 Marks

c. **Grand Total** (Paper + Class Participation/ Assignments): **50 Marks**

## Second Professional MBBS Examination (2021)

### PAKISTAN STUDIES

#### Division of Marks (Total Marks 50)

##### a. Paper

Serial	Chapter/Topic	Marks Division	
		MCQs	SEQs
1	Basic Concept for Establishment of Pakistan & Role of Muslim Reformers (one SEQ)	3	7
2	Muslim Political Struggle (one SEQ)	2	7
3	Pakistan Movement (two SEQs)	3	14
4	Establishment of Pakistan (one SEQ)	2	7
<b>Total Marks</b>		<b>10</b>	<b>35</b>
<ul style="list-style-type: none"><li>• First question will be Objective Type (MCQs), carrying 10 Marks.</li><li>• Five SEQs (each carrying 7 Marks)</li></ul>			

b. **Class Participation/ Assignments:** 5 Marks

c. **Grand Total** (Paper + Class Participation/ Assignments): **50 Marks**

**Second Professional MBBS Examination (2021)**

**Ethics for Non-Muslims**

Topic No.	Topics	Total time – 90 Minutes		Reflective portfolio
		MCQs 1 Marks each	SAQs 7 Marks each	
1	Introduction to Ethics	02	01	
2	Historical development of Ethics	02	01	
3	Moral Ethics and Society	02	01	
4	Professional Ethics	02	01	
5	Multiculturalism	02	01	
6	Reflective Essays			2
	<b>Total</b>	<b>10(10 marks)</b>	<b>05(7 Marks each)</b>	<b>02 (5 marks)</b>

**Note:** The students will maintain a ‘Reflective portfolio’ writing their reflective essays on various topics as continuous assessment which will be marked by the instructor.