



**DENTAL COLLEGE HITEC-IMS**

**Study Guide Y1 - B1 - D22**

**Block I**

**1st Year BDS**

**Coordinator: Dr. Saman Malik**



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## List of Abbreviations

- ANS Automatic Nervous System
- CBL Case Base Learning
- EECS Early Exposure to Clinical Skills
- EOB End of Block Examination
- FGD Focus Group Discussion
- GIT Gastrointestinal Tract
- LGIF Large Group Instructional Format
- LGIS Large Group Interactive Session
- MCQ Multiple Choice Question
- MIT Mode of Information Transfer
- NUMS National University of Medical Sciences
- OSCE Objectively Structured Clinical Examination
- OSPE Objectively Structured Practical Examination
- PMC Pakistan Medical Commission
- SAQ Short Answer Question
- SDL Self-Directed Learning
- SEQ Structured Essay Questions
- SGD Small Group Discussion
- TOS Table of Specification
- WFME World Federation of Medical Education
- IMLC Interactive Method to Learn Cranial Nerves



### **NUMS Vision**

The vision of the National University of Medical Sciences is to improve the quality of life through education, research, innovation, and healthcare, thereby contributing to endeavors to make Pakistan and this world a better place to live in.

### **Institutional Vision**

Leading advancement in Oral & Dental health through excellence in education, patient care and research

### **Institutional Mission**

To serve the local and global communities by producing competent, ethical, socially responsible, research oriented and life long learning oral health care professionals



## Block Committee

Coordinator: **Assistant Prof. Dr Saman Malik**

HoD Oral Biology, Contact No: 0312-3456303

S No.	Name	Designation	Departments	Contact Number
1.	<b>Dr Rai Tariq</b>	Professor	Community Dentistry	0333-5718658
2.	<b>Dr Sadaf Mumtaz</b>	Professor	Physiology	0347-5157965
3.	<b>Dr Ayesha Haque</b>	Associate Professor	Anatomy	0314-4568252
4.	<b>Dr Ambreen Gul</b>	Associate Professor	Biochemistry	0300-5905179
5.	<b>Dr Saman Malik</b>	Assistant Professor	Oral Biology	0312-3456303
6.	<b>Dr Faizan Munir</b>	Assistant Professor	Dental Education	0334-0031031
7.	<b>Dr Fatima Tuz Zahra</b>	Lecturer	Behavioural Sciences	0307-5887485
8.	<b>Urwa Liaqat</b>	Student	1 <sup>st</sup> Year	0333-5949679
9.	<b>Arshia Shoukat</b>	Student	2 <sup>nd</sup> Year	0311-0796622
10.	<b>Anas Nadir</b>	Student	2 <sup>nd</sup> Year	0313-6112202



## **Curriculum Overview/Implementation**

### **Preface**

The curriculum meets the standards of the Pakistan Medical Commission, the Higher Education Commission of Pakistan, and the World Federation of Medical Education. On completion of the program, our students have required competencies as defined worldwide in a graduate doctor.

### **Model**

The curriculum of Dental College HITEC-IMS is based on the traditional, discipline-based model of educational strategies. However, we have incorporated some elements of the SPICES model, such as its student-centered, integrated, community-oriented, and systematic aspects. In addition, our curriculum has evolved, considering traditional, experiential, behavioral, attributional and constructivist perspectives of curricula.

### **Organization**

The curriculum is organized and integrated along important vertical and horizontal dimensions. The content taught is integrated concurrently in the horizontal organization and vertically across the years of dental education. The course of the first year is divided into three blocks. In each block, the sequencing of the content is logical and integrated.

### **Teaching Strategies**

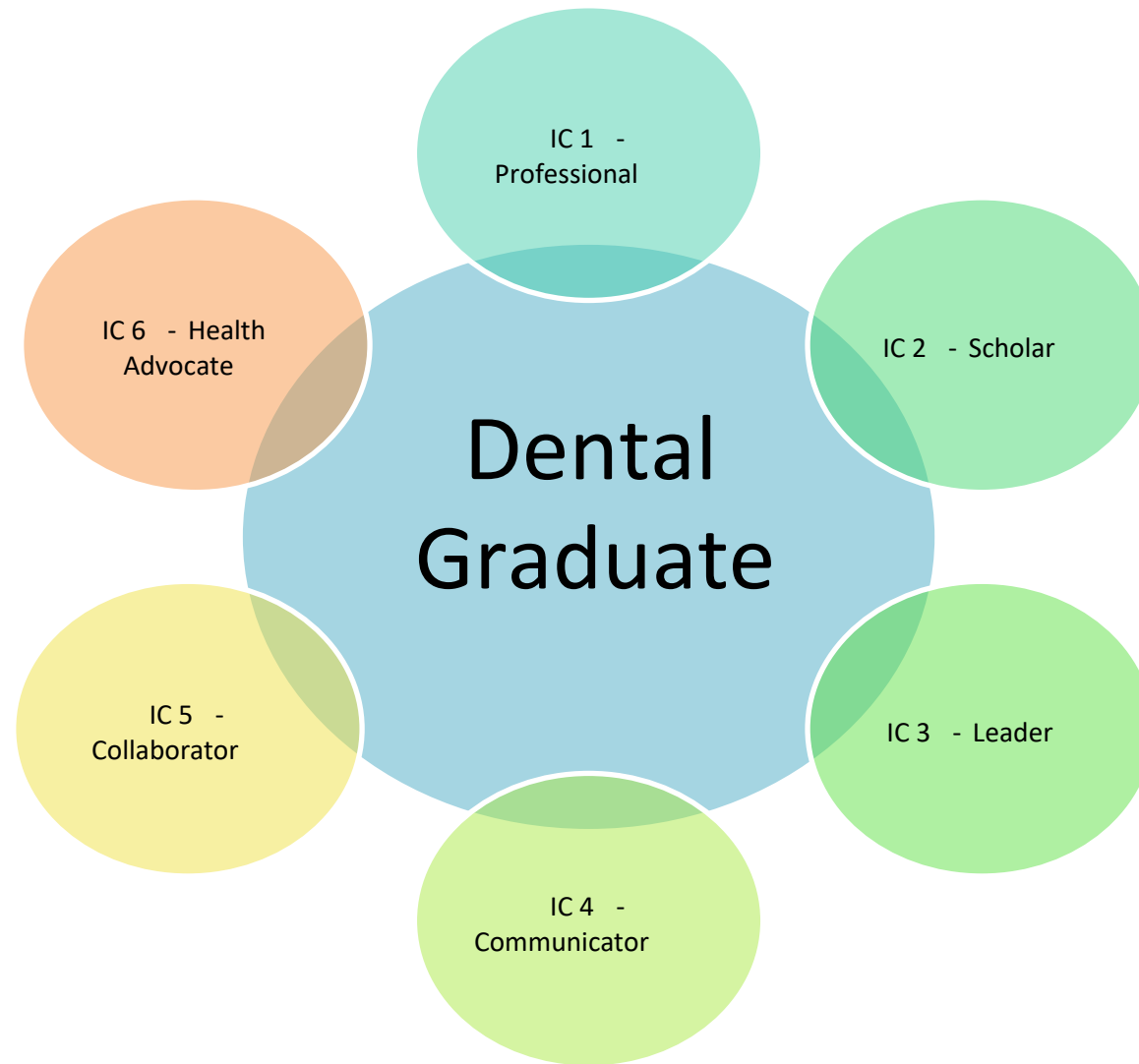
Multiple teaching strategies are used. LGIS are used to provoke thought, understanding and to standardize the delivery of concepts. It helps them to understand general themes of subject matter, updated research and best evidence medical information. We are teaching clinical implications of each topic to integrate basic and clinical sciences. This encounter is based on experience that is contextual, realistic, and relevant. Small group discussions encourage students to learn socially, discuss their concepts and refine their schemas. Working in laboratories and the dissection hall provides experiential and hands-on learning.

### **Assessment**

The summative assessment includes end of block and pre annual examination. Formative assessment is based on assignments, presentation, flipped classroom journal club, quizzes and class tests. After the block exams and end of academic year, a pre annual examination is conducted according to standards outlined by NUMS.



## 1. Institutional Competency Framework







## **2. Alignment of Block Outcomes with Institutional Competencies**

<b>S. No.</b>	<b>Block Outcomes</b>	<b>Institutional Competencies</b>
1.	Correlate the anatomy of cells and their biochemical reactions with its application in clinical practice	IC 1 to IC 6
2.	Relate the histology of nerve, bone and muscle with its function along with clinical relevance	IC 2 to IC 6
3.	Discuss the anatomical and histological features of hard and soft tissues, including the head and neck region	IC 2
4.	Integrate the fundamental concepts of social and behavioral sciences with knowledge of other medical subjects	IC 1, IC 2, IC 6
5.	Apply the principles of research for writing research proposals	IC 2, IC 4, IC 5, IC 6
6.	Analyze multiple perspectives of Pakistan studies and Islamiyat	IC1, IC 2



## Assessment

### Types and Schedules



Assessment is continuous via class tests, quizzes, and assignments by the department. Continuous assessment is separate from the block exam that will be held at the end of 13<sup>th</sup> weeks of instruction.

Formative assessment will be in the form of tests/ written assignments/reflective writing/ presentations and feedback to the students during the teaching time. The purpose of formative assessment is to provide feedback to the students for improvement and for teachers to identify areas where students need further guidance.

From the 2<sup>nd</sup> week onwards, the class tests of Biochemistry, Physiology, Anatomy and Oral Biology will be held on a rotation basis, respectively. Finally, the 14<sup>th</sup> week will be dedicated to End of Block (EOB) exams. The EOB exam will comprise of theory and practical exam separately. EOB along with pre-annual exams, will contribute to marks in internal assessment, to be submitted to the university.

Students must secure 50% marks in theory and practical exams separately, per university criteria.

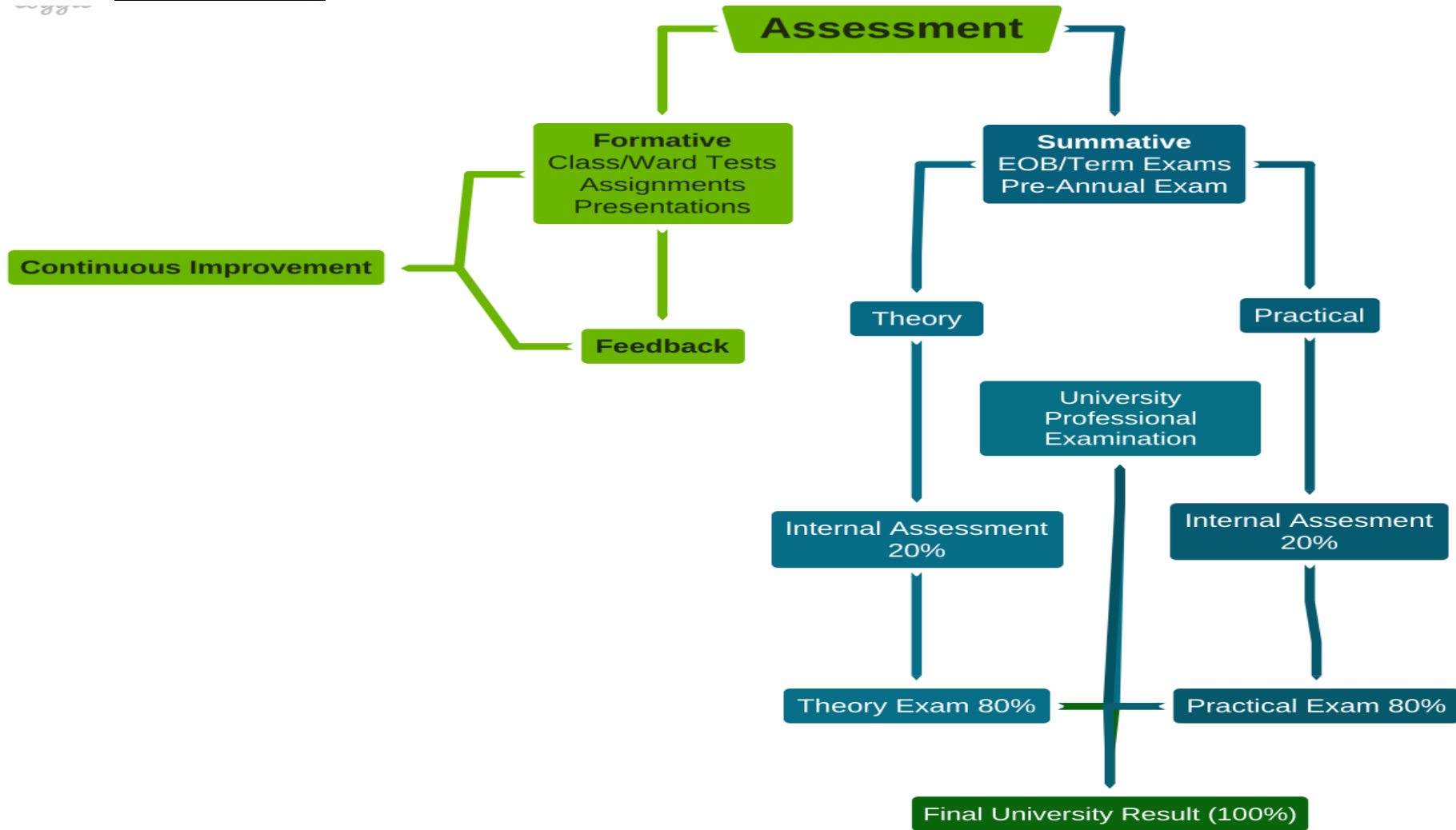
The students who fail at the end of the block exam will be allowed to attend the next block; however, his/her internal assessment will be affected accordingly.

#### **Internal assessment criteria for submission of internal assessment marks of first Professional Examination NUMS:**

1. The weightage of internal assessment shall be 20 marks for a 100 marks Paper (20%) in the annual examination.
2. End of block examinations, and pre-annual examination shall contribute to internal assessment.



## 2. Assessment Map





### 3. Academic Calendar

#### 1<sup>st</sup> Year BDS CLASS-2022

Commencement of Classes - 01.02.2022			
BLOCK - 1 (14 WEEKS)			
(15 – 02 - 22 To 17 – 05 - 22)			
Activity	Duration	From	To
Orientation	01 week	01-02-22	6-02-22
Academics	07 weeks	7-02-22	25-03-22
Sports Week	01 week	28-03-22	01-04-22
Academics	04 weeks	04-04-22	29-04-22
Public Holiday	Nil	-----	----
Block Assessment	01 week (09 days)	09-05-22	17-05-22
Eid Ul Fitr	01 week (09 days)	30-04-22	08-05-22
Block - 2 (13 Weeks)			
(18 – 05 - 22 To 21 – 08 - 22)			
Academics	6 weeks	18-05-22	27-06-22
Public Holidays	Nil	----	-----
Eid-UI Azha+ Vacations	03 weeks	27-06-22	17-07-22
Academics	03 weeks	18-07-22	06-08-22
Block Assessment	01 week	09-08-22	21-08-22
Block - 3 (14 Weeks)			
(22 – 08 - 22 To 09 – 11 - 22)			
Academics	12 weeks	22-08-22	09 -11-22
Public Holiday	Nil	-----	-----
Send-Up	02 weeks	14-11-22	01-12-22
Pre-Prof Leave	26 Days	02-12-22	26-12-22
1 <sup>st</sup> Professional Exam (Tentative)	25 <sup>th</sup> of December 2022		



## Sample Timetable

Day/ Time	8:30-9:20	9:20-10:10	10:10-10:30	10:30-11:20	11:20-12:10	12:10-12:30	12:30-1:50	1:50-3:30	
<b>Monday</b>	<u>Anatomy</u>	<u>Biochemistry</u>	-----Break-----	<u>PHYSIOLOGY</u>		-----Break-----	<u>PRACTICAL</u>	<u>ORAL BIOLOGY</u> <u>PRACTICAL</u>	
<b>Tuesday</b>	<u>PHYSIOLOGY</u>	<u>ORAL BIOLOGY</u>		<u>ANATOMY</u>			<u>PRACTICAL</u>	<u>1:50-2:50</u> <u>ORAL BIOLOGY</u>	<u>2:50:3:30</u> <u>BEHAVIOR SCIENCES</u>
<b>Wednesday</b>	<u>BIOCHEMISTRY</u>	<u>ANATOMY</u>		<u>PHYSIOLOGY</u>			<u>ORAL BIOLOGY</u>	<u>ANATOMY</u>	<u>ORAL BIOLOGY</u> <u>PRACTICAL</u>
<b>Thursday</b>	<u>ANATOMY Dissection</u>			<u>BIOCHEMISTRY</u>	<u>PHYSIOLOGY</u>		<u>PRACTICAL</u>	<u>1:50- 2:30</u> <u>ANATOMY</u> SDL	<u>2:30-3:30</u> <u>ANATOMY</u> DISSECTION
<b>Friday</b>	<u>8:30-9:20</u> <u>ORAL BIOLOGY</u>	<u>9:20-10:10</u> <u>BIOCHEMISTRY</u>		<u>10:10-11:20</u> <u>PHYSIOLOGY</u>	<u>11:20-12:00</u> <u>ISLAMIAT/PAK STUDIES</u>		<u>12:00-1:00</u> <u>BIOCHEMISTRY</u>	<u>1:00-1:30</u> <b>Break</b>	<u>1:30-2:30</u> <u>PHYSIOLOGY</u>



## **Block - I**

# **Foundation of Basic Sciences**



### Structured Summary of Block I

<b>Block Code</b>	<b>Y1-B1-D22</b>
<b>Block Title</b>	Foundation of Basic Sciences
<b>Duration Of Block</b>	14 (12+1 academics) Weeks (1 sports week, 1 week Eid ul Fitr holidays)
<b>Important Dates</b>	1 <sup>st</sup> Feb 2022 - 17 <sup>th</sup> May 2022
<b>Horizontally Integrated Themes/Topics</b>	1.CVS 2.Blood 3.Electrolyte
<b>Vertically Integrated Themes/Topics</b>	Research Methodology Behavioral Sciences
<b>Prerequisite Blocks</b>	FSc/A level



## 1. Tentative Class Test Schedules<sup>1</sup>

DATE	SUBJECT	DAY
28 <sup>th</sup> Feb-22	Biochemistry	Monday
07 <sup>th</sup> March-22	Physiology	Monday
14 <sup>th</sup> March-22	Anatomy	Monday
21 <sup>st</sup> -March-22	Oral Biology	Monday
25 <sup>th</sup> March-22	Biochemistry	Friday

DATE	SUBJECT	DAY
4 <sup>th</sup> April-22	Oral Biology	Monday
11 <sup>th</sup> April 22	Biochemistry	Monday
18 <sup>th</sup> April-22	Physiology	Monday
25 <sup>th</sup> April-22	Anatomy	Monday
28 <sup>th</sup> April-22	Oral Biology	Thursday

<sup>1</sup> This is a tentative schedule. Therefore, it is subject to change.





## Tentative End of Block (EOB) Exam Schedule <sup>2</sup>

<b>Dates</b>	<b>Subject</b>	<b>8:30 - 11:30</b>	<b>12:00 pm - 3:30 pm</b>
<b>9 – 5 - 22</b>	Anatomy	Theory	Viva
<b>11 – 5 - 22</b>	Biochemistry	Theory	Viva
<b>13 – 5 - 22</b>	Oral Biology	Theory	Viva
<b>16 - 5 - 22</b>	Physiology	Theory	Viva
<b>17 – 4 - 22</b>	Integrated OSPE		

<sup>2</sup> This is a tentative schedule. Therefore, it is subject to change.



## Learning Outcomes for Block I

### 1. Physiology

S. No.	Topics/ Theme	Learning Outcomes	Learning Objectives	IC Codes	MIT	Assessment Tools
		By the end of this block, students should be able to:				
		<b>Cell Physiology</b>				
1.	Homeostasis	Discuss functional organization of the human body and control of the “Internal Environment”	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>• Explain the interplay of various organ systems in maintaining homeostasis.</li> <li>• Identify the role of feedback mechanisms (positive, negative, feedforward) in maintaining an ‘internal milieu.’</li> <li>• Differentiate between the composition of intracellular and extra cellular fluid</li> </ul>	IC 2	LGIS	MCOs SEQs Viva Voce
			<b><u>Skill</u></b> <ul style="list-style-type: none"> <li>• Record average body temperature</li> </ul>	IC 2 IC 4	Practical Demonstration	OSPE



2.	Cell Physiology	Discuss the structure of the cell and its various components to metabolic processes, genetic control, and locomotion	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>• Discuss the structure and function of the cell and its organelles (cell membrane, cytoplasmic organelles, nuclear membrane, nuclear organelles)</li> <li>• Compare modes of transport of substances across the cell membrane</li> <li>• Discuss cell membrane with examples (Osmosis, diffusion, facilitated diffusion, primary active transport, secondary active transport)</li> </ul>	IC 2	LGIS	MCQs SEQ Viva Voce
			<b><u>Skill</u></b> <ul style="list-style-type: none"> <li>• Identify the parts of the microscope</li> <li>• Practice focusing of slides at different magnification</li> </ul>	IC 1 IC 4	Practical Demonstration	OSPE
			<b><u>Attitude</u></b> <ul style="list-style-type: none"> <li>• Follow the proper dress code of a medical laboratory</li> <li>• Demonstrate proper use of microscopes and slides properly according to prescribed SOPs</li> <li>• Report any damage to lab equipment immediately</li> </ul>	IC 1 IC 4 IC 5	Practical Demonstration	Formative Checklist
<b>NERVE AND MUSCLE</b>						
3.	Membrane potentials and action potentials	Differentiate various types and phases of action potentials based on nerve morphology,	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>• Discuss the basis of development of membrane potential across an excitable membrane</li> </ul>	IC 2	LGIS	MCQ SEQ Viva Voce



		the concentration of ions in body fluid compartments and clinical significance	<ul style="list-style-type: none"><li>• Explain Nernst potential and its importance in the generation of membrane potential</li><li>• Identify various factors/mechanisms responsible for the genesis of membrane potential</li><li>• Illustrate different phases of action potential mentioning details of ionic changes occurring during each phase of action potential</li><li>• Differentiate between types and importance of refractory period</li><li>• Differentiate between myelinated and non-myelinated nerve fibers based on their structure and characteristics</li></ul>			
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4.	Excitation contraction coupling and NMJ	Correlate the physiological mechanism of neuromuscular transmission and excitation-contraction coupling with various neuromuscular diseases	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Tabulate macroscopic, microscopic, and functional differences of various types of muscles. Illustrate neuromuscular junction, sequence of events taking place during neuromuscular transmission</li> <li>• Explain the physiological importance of a motor unit</li> <li>• Describe the ionic and chemical basis of muscle contraction</li> <li>• Distinguish between phases of muscle contraction in detail</li> <li>• Discuss the pathophysiology of neuromuscular transmission in myasthenia gravis</li> </ul>	IC 2 IC 3 IC 4 IC 5	LGIS Flipped classroom Journal Club	MCQs SEQs Viva Voce Presentations
5.	Excitation and Contraction of Smooth Muscle	Explain the characteristics of smooth muscle contraction with their physiological significance	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Describe the role of Smooth endoplasmic reticulum in smooth muscle contraction</li> </ul>	IC 2	LGIS	MCQs SEQs Viva Voce
<b>BLOOD</b>						
6.	Hemopoiesis	Describe the morphology and genesis of blood cells	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Differentiate between various types of blood cells based on their morphological and physiological characteristics.</li> </ul>	IC 2	LGIS	MCQs SEQs Viva Voce



			<ul style="list-style-type: none"> <li>• Discuss sites of hemopoiesis in the body during different life stages along with bone marrow composition and functions</li> <li>• Identify the factors regulating erythropoiesis and maturation of red blood cells</li> <li>• Discuss the composition of blood and general functions of blood</li> </ul>			
			<p><b><u>Skill</u></b></p> <ul style="list-style-type: none"> <li>• Demonstrate Hematocrit estimation</li> </ul>	IC 4 IC 5	Practical demonstration	OSPE
			<p><b><u>Attitude</u></b></p> <ul style="list-style-type: none"> <li>• Follow the proper dress code of a medical laboratory</li> <li>• Maintain his/her workstation according to the prescribed SOPs</li> <li>• Report any damage to lab equipment immediately</li> </ul>	IC 1 IC 4 IC 5	Practical demonstration	Formative checklists
7.	Red Blood Cells Dyscrasias	Differentiate between various types of anaemias and their clinical and lab presentation	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Discuss the morphology and physiology of different types of haemoglobin</li> <li>• Compare different types of anaemia based on aetiology, pathophysiology, clinical presentations, and blood picture</li> </ul>	IC 2	LGIS	MCQs SEQs Viva Voce



			<ul style="list-style-type: none"> <li>Describe the aetiology, pathophysiology, and clinical presentation of polycythaemia</li> </ul>			
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Measure red cell indices and Hb estimation using Sahli's apparatus</li> <li>Calculate red cell count using Neubauer's chamber</li> </ul>	IC 4 IC 5	Practical demonstration	OSPE
			<p><b>Attitude</b></p> <ul style="list-style-type: none"> <li>Follow the proper dress code of a medical laboratory</li> <li>Obtain consent before starting the procedure and thank in the end</li> <li>Maintain his/her workstation according to the prescribed SOPs</li> <li>Report any damage to lab equipment immediately</li> </ul>	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist



8.	WBCs & Immunity	Classify different types of immunity based on cell types and their role in defense mechanisms	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>Correlate the morphology and physiology of different WBCs with clinical presentations of leukopenia, leucocytosis, and leukaemia</li> <li>Appraise the clinical significance of the reticuloendothelial system (RES)</li> <li>Describe the pathophysiology of inflammation and necrosis</li> <li>Describe the physiological basis of vaccination</li> </ul>	IC 2	LGIS	MCQs SEQs Viva Voce
			<b><u>Skill</u></b> <ul style="list-style-type: none"> <li>Calculate total leucocyte count cell count using Neubauer's chamber</li> </ul>	IC 4 IC 5	Practical demonstration	OSPE
			<b><u>Attitude</u></b> <ul style="list-style-type: none"> <li>Follow the proper dress code of a medical laboratory</li> <li>Obtain consent before starting the procedure and thank in the end</li> <li>Maintain his/her workstation according to the prescribed SOPs</li> </ul>	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist





9.	Haemostasis and Blood Coagulation	Compare various bleeding disorders	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>Identify the role of cells and proteins involved in maintaining haemostasis</li> <li>Differentiate between intrinsic and extrinsic regulations of blood coagulation</li> <li>Discuss the morphology, aetiology, pathophysiology and clinical presentation of thrombocytopenia, thrombocytosis and haemophilia</li> </ul>	IC 2	LGIS	MCOs SEQs Viva Voce
			<b><u>Skill</u></b> <ul style="list-style-type: none"> <li>Calculate platelet count using Neubauer's chamber</li> </ul>	IC 4 IC 5	Practical demonstration	OSPE
			<b><u>Attitude</u></b> <ul style="list-style-type: none"> <li>Follow the proper dress code of a medical laboratory</li> <li>Obtain consent before starting the procedure and thank in the end</li> <li>Maintain his/her workstation according to the prescribed SOPs</li> </ul>	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist
10.	Blood grouping and transfusion reactions	Analyze transfusion reactions	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>Explain the principles of blood grouping keeping in view their physiological significance</li> <li>Identify the various blood groups and hazards of matched and mismatched blood</li> </ul>	IC 2	LGIS	MCOs SEQs Viva Voce



			<b>Skill</b> <ul style="list-style-type: none"> <li>Identify ABO and Rh blood groups</li> </ul>	IC 4 IC 5	Practical demonstration	OSPE
			<b>Attitude:</b> <ul style="list-style-type: none"> <li>Follow the proper dress code of a medical laboratory</li> <li>Obtain consent before starting the procedure and thank in the end</li> <li>Maintain his/her workstation according to the prescribed SOPs</li> </ul>	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist
<b>CVS</b>						
11.	Physiological anatomy of the heart and cardiac action potential	Discuss the functional characteristics of cardiac muscle, action potential and cardiac impulse	<b>Knowledge</b> <ul style="list-style-type: none"> <li>Discuss the physiological arrangement of right and left hearts and the parallel arrangement of the systemic circulation</li> <li>Explain physiological anatomy of cardiac muscles, its functional syncytium and intercalated disc</li> <li>Differentiate between cardiac, skeletal, and smooth muscles based on macro-, microscopic, functional differences, and action potentials</li> <li>Distinguish ionic changes in different phases of an action potential within cardiac muscle</li> <li>Correlate the phases with ionic changes during pacemaker action potential in the heart</li> </ul>	IC 2	LGIS	MCQs SEQs Viva Voce



			<ul style="list-style-type: none"> <li>Discuss cardiac impulse transmission</li> </ul>			
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Examine the radial pulse</li> </ul>	IC 1 IC 3 IC 4 IC 5	Practical demonstration	OSPE
			<p><b>Attitude</b></p> <ul style="list-style-type: none"> <li>Follow the proper dress code of a medical laboratory</li> <li>Obtain consent before starting the procedure and thank in the end</li> <li>Maintain his/her workstation according to the prescribed SOPs</li> </ul>	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist
12.	Cardiac Cycle	Compare the pressure and volume changes in different components of the circulatory system during the cardiac cycle	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Illustrate pressure and volume changes during various phases of the cardiac cycle</li> <li>Illustrate a pressure-volume diagram of the left heart</li> <li>Discuss preload and afterload, and their influence on stroke volume (The Frank Starling's mechanism)</li> <li>Discuss the autonomic regulation of the heart</li> </ul>	IC 2	LGIS	MCQs SEQs Viva Voce
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Record Blood Pressure using palpatory and auscultatory method</li> </ul>	IC 1 IC 4 IC 5	Practical demonstration	OSPE



			<ul style="list-style-type: none"> <li>Illustrate the effects of posture and exercise on Blood Pressure</li> </ul>			
			<p><b>Attitude</b></p> <ul style="list-style-type: none"> <li>Follow the proper dress code of a medical laboratory</li> <li>Obtain consent before starting the procedure and thank them in the end</li> <li>Maintain his/her workstation according to the prescribed SOPs</li> <li>Report any damage to lab equipment immediately</li> </ul>	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist
13.	Control of Local Blood	Identify the dynamics of local and peripheral Blood flow	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Distinguish between acute and chronic control of local blood flow</li> <li>Discuss active and reactive hyperaemia</li> <li>Discuss the mechanism of blood flow control in relation to total peripheral resistance</li> </ul>	IC 2	LGIS	MCQs SEQs Viva Voce
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Measure bleeding time and clotting time on the given sample</li> <li>Calculate Differential Leukocyte Count (DLC) using Neubauer's chamber</li> </ul>	IC 4 IC 5	Practical demonstration	OSPE



			<p><b><u>Attitude</u></b></p> <ul style="list-style-type: none"><li>• Follow the proper dress code of a medical laboratory</li><li>• Obtain consent before starting the procedure and thank them in the end</li><li>• Maintain his/her workstation according to the prescribed SOPs</li><li>• Report any damage to lab equipment immediately</li></ul>	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist
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2. Anatomy						
S. No	Topics/ Theme	Learning Outcomes	Learning Objectives	MITs	IC Codes	Assessment Tool
1.	Introduction to Anatomy	Identify the anatomical terms, plans, movements & study techniques in anatomy	<p>By the end of this block, students should be able to:</p> <p><b><u>Knowledge</u></b></p> <ol style="list-style-type: none"> <li>1. Define different disciplines of Anatomy</li> <li>2. Identify terms of position in relation to anatomical position: <ul style="list-style-type: none"> <li>• Anterior /Posterior</li> <li>• Ventral /Dorsal</li> <li>• Superior /Inferior</li> <li>• Caudal / Rostral / Cranial</li> <li>• Medial /Lateral</li> <li>• Proximal /Distal</li> <li>• Palmar /plantar</li> <li>• Superficial/Deep</li> <li>• Supine /Prone</li> </ul> </li> <li>3. Demonstrate the standard anatomical position</li> <li>4. Identify the following anatomical planes with the help of diagrams <ul style="list-style-type: none"> <li>• Coronal</li> <li>• Sagittal</li> <li>• Horizontal</li> <li>• Parasagittal</li> </ul> </li> <li>5. Identify the terms of movements with general reference to the axis and planes in which they occur and demonstrate each on the subject</li> </ol>	LGIS SGD	IC 2	MCQs SEQs VIVA VOCE



			<ul style="list-style-type: none"> <li>• Flexion /Extension</li> <li>• Abduction /Adduction</li> <li>• Lateral rotation / Medial rotation</li> <li>• Pronation /Supination</li> <li>• Plantar flexion / Dorsal flexion</li> <li>• Circumduction</li> <li>• Eversion /Inversion</li> </ul> <p>6. Identify the various techniques to study anatomy in the living, such as plain radiographs</p>			
2.	Osteology	Summarize the general features of bones	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Identify the axial and appendicular parts of a human skeleton.</li> <li>• Classify bones according to their development and shape, giving examples of each type, especially from the head and neck (wherever possible)</li> <li>• Describe the process of both types of ossification</li> <li>• Describe the blood supply of the long &amp; diploic bones</li> </ul>	LGIS SGD	IC 2	MCQs SEQs VIVA VOCE
3	Myology	Appraise the general anatomical features of muscles	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Classify muscles into three basic types</li> <li>• Correlate skeletal muscles according to their shape, Muscle fibre types and functions with examples of each type</li> </ul>	LGIS SGD	IC 2	MCQs SEQs VIVA VOCE



4.	Circulatory system	Summarize the general anatomical features of the circulatory system	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Discuss the general plan of systemic, portal, and lymphatic circulatory systems</li> <li>• Compare blood vessels according to their size and functions with examples of each type</li> <li>• Describe various types of anastomoses with example and their clinical significance</li> </ul>	LGIS SGD	IC 2	MCQs SEQs VIVA VOCE
5.	Handling of models	Demonstrate professional attitude while dealing with learning resources	<p><b><u>Skill</u></b></p> <ul style="list-style-type: none"> <li>• Follow the proper dress code of a laboratory</li> <li>• Demonstrate correct handling of models according to standard operating procedures displayed in the anatomy museum</li> <li>• Demonstrate correct placing of model parts after the task and return them to the authorized person</li> <li>• Report any damage to the model</li> </ul>	Practical	IC 1 IC 4	OSPE Formative Checklist





<b>3. Biochemistry</b>						
<b>S. N o.</b>	<b>Topic/ Theme</b>	<b>Learning Outcomes</b>	<b>Learning Objectives</b>	<b>Instructional Strategies</b>	<b>IC Codes</b>	<b>Assessment Tool</b>
1	Introduction to Biochemistry	Discuss the basic concepts of biochemistry	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Explain the scope &amp; importance of Biochemistry</li> <li>• Elaborate on various biomolecules and their significance</li> </ul>	LGIS SGD	IC 2	MCQ SAQ/SEQ Viva
2	Biochemistry of cell	Differentiate between cell organelles, their structure, biochemical functions, and associated disorders List various cytology techniques for the study of a cell	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Enumerate various Cell Organelles (Nucleus, Mitochondria, Ribosomes, Golgi Apparatus, Endoplasmic Reticulum, Lysosomes and Peroxisomes)</li> <li>• Discuss the biochemical functions of these organelles in cellular metabolism</li> <li>• Elaborate genetic control of cellular functions with the help of a diagram</li> <li>• Discuss various cytology techniques for the study of a cell</li> <li>• Explain centrifugation</li> </ul>	LGIS SGD	IC 2	MCQ SAQ/SEQ Viva



3.	Biological Membranes	Discuss the chemical composition of a cell membrane and its significance regarding a particular cellular environment	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Explain the chemical composition of the cell membrane with the help of a diagram and describe its significance regarding its composition</li> <li>• Discuss the mechanism of transport across the cell membrane</li> </ul>	LGIS SGD	IC 2	MCQ SAQ/SEQ Viva
		Discuss the concept of chemistry and the role of signal transduction in health and disease	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Describe the chemistry of the cell signaling mechanism and enlist various receptors involved in it accordingly</li> <li>• Elaborate on the role of signal transduction in health and disease</li> <li>• Discuss the Mechanisms of signal transduction (e.g., G-Proteins associated pathways)</li> </ul>	LGIS SGD	IC 2	MCQ SAQ/SEQ Viva
4.	Biochemistry of body fluids	Demonstrate understanding of the biochemistry of body fluids	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Discuss the ionisation of water and weak acids and bases</li> <li>• Elaborate the concept of pH and pH scale</li> <li>• Discuss dissociation constant &amp; titration curve of weak acids, the concept of pK values</li> <li>• Describe buffers, their mechanism of action</li> <li>• Discuss Henderson-Hassel Balch Equation (No derivation)</li> </ul>	LGIS SGD	IC 2	MCQ SAQ/SEQ Viva



			<ul style="list-style-type: none"> <li>• Discuss biomedical importance of osmosis and osmotic pressure</li> <li>• Describe the surface tension, viscosity &amp; their importance to body fluids</li> </ul>			
5.	Protein Chemistry	Discuss the significance of different proteins in medicine	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Describe proteins, dipeptides, tripeptides, and polypeptides with examples</li> <li>• Describe structural organisation of proteins and their Biochemical importance</li> <li>• Classify proteins (physicochemical, functional, structural, nutritional etc.)</li> <li>• Define amino acids</li> <li>• Draw their structure and explain their various properties &amp; function</li> <li>• Classify amino acids and give their nutritional significance</li> <li>• Discuss fibrous and globular proteins</li> <li>• Describe the dissociation &amp; titration curve and the importance of amino acids regarding pH maintenance in the human body</li> <li>• Enlist various proteins' separation mechanisms, e.g., salting out, Electrophoresis, Chromatography and Centrifugation, etc. Explain each in detail</li> </ul>	LGIS	IC 2	MCQ SAQ/SEQ Viva



			<ul style="list-style-type: none"> <li>• Explain foldings &amp; misfolding of proteins along with associated diseases</li> </ul>			
6.	Plasma proteins and Immunoglobulins	Discuss the basic knowledge of plasma proteins to their clinical significance	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Define plasma proteins &amp; give their clinical significance</li> <li>• Draw and label the structure of Immunoglobulins</li> <li>• Enumerate the major types, functions &amp; clinical significance of immunoglobulins</li> </ul>	LGIS SGD	IC 2	MCQ SAQ/SEQ Viva
7.	Enzymes	Apply the basic concepts of enzymes in clinical diagnosis and therapeutic use Elaborate on the biochemical importance of enzymes, coenzymes, co-factors, and isoenzymes, as well as their role in various clinical conditions	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Define enzymes and classify them based on their mechanism of actions</li> <li>• Explain co-enzymes, cofactors, and isoenzymes with their biochemical importance</li> <li>• Discuss the mechanism of catalysis of enzymes</li> <li>• Describe the factors affecting enzymes activity Introduction, definition</li> <li>• Define Michaelis Menten equation &amp; Line weaver Burk plot and its application in enzyme kinetics (no derivation of equations)</li> <li>• Compare different types of enzyme inhibitions with examples &amp; biomedical importance</li> </ul>	LGIS SGD	IC 2	MCQ SAQ/SEQ Viva



			<ul style="list-style-type: none"> <li>• Explain the regulation of enzyme activity-overview</li> <li>• Discuss the role of enzymes in clinical diagnosis and therapeutic use</li> </ul>			
8.	Nucleotides chemistry	Discuss the knowledge of chemistry and metabolism of nucleotide in health and disease	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Describe the types of structure, and functions Nucleic acids and nucleotides</li> <li>• Discuss the chemistry and structure of nucleotides and their biochemical role</li> <li>• Explain biochemical roles of nucleotides</li> </ul>	LGIS SGD	IC 2	MCQ SAQ/SEQ Viva
9.	Globular proteins/ haemoglobin	Discuss the biochemical basis of Porphyrin and Haemoglobin with clinical conditions	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Explain the chemistry and biosynthesis of haemoglobin</li> <li>• Discuss structure, functions, and types of haemoglobin</li> <li>• Explain the oxygen binding capacity of haemoglobin, factors affecting and regulating the oxygen-binding capacity of haemoglobin</li> <li>• Describe degradation of heme, formation of Bile pigments, its types, transport, and excretion</li> <li>• Describe Jaundice and its types</li> <li>• Discuss hemoglobinopathies (HP- S, Thalassemia) and their biochemical causes</li> </ul>	LGIS SGD	IC 2	MCQ SAQ/SEQ Viva



10.	Carbohydrate chemistry	Discuss the significance of different carbohydrates in medicine	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Describe the biomedical importance of carbohydrates</li> <li>• Discuss the structure and functions of monosaccharides and their derivatives</li> <li>• Describe Disaccharides - their important examples</li> <li>• Describe Oligosaccharides-their combination with other macromolecules</li> <li>• Discuss Polysaccharides- their important examples and biochemical role</li> </ul>	LGIS SGD	IC 2	MCQ SAQ Viva
11.	Practical	Demonstrate the use of different glassware and instruments along with identification	<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>• Demonstrate correct use of glassware</li> <li>• Demonstrate correct use of: Microlab, Incubator, Water Bath, Hot air oven, Centrifuge Machine, Electronic Balance and pH meter</li> </ul>	Demonstration	IC 1 IC 4 IC 5	OSPE
		Analyse the results of a given experiment/ Qualitative analysis of Proteins	<ul style="list-style-type: none"> <li>• Perform the following tests:</li> <li>• Biuret Test</li> <li>• Ninhydrin Test</li> <li>• Xanthoproteic Test</li> <li>• Millon's Test</li> <li>• Aldehyde Test</li> <li>• Sulphur Test</li> </ul>	Practical	IC 4 IC 5	OSPE



12.	Handling the equipment and chemicals	Practice safety during lab work (All Modules)	<p><b><u>Attitude</u></b></p> <ul style="list-style-type: none"> <li>• Follow the proper dress code of a laboratory</li> <li>• Handle chemicals and lab equipment correctly according to SOPs displayed in the laboratory</li> <li>• Report any damage to lab equipment immediately</li> </ul>	Demonstration	IC 1 IC 4 IC 5	Formative Checklist
13.	Cleanliness of workstation	Arrange the required apparatus and chemicals safely	<p><b><u>Attitude</u></b></p> <ul style="list-style-type: none"> <li>• Maintain workstation according to SOPs</li> <li>• Demonstrate effective communication skills</li> <li>• Demonstrate time management skills</li> </ul>	SGD	IC 1 IC 4 IC 5	Formative Checklist



#### 4. Oral Biology

Weeks	Topic/Theme	Learning Outcomes	Learning Objectives/Outcomes	IC Codes	MITs	Assessment Tools
Week 01	Introduction and nomenclature	Discuss basic principles of Nomenclature on dentition.	<b>Knowledge</b> <ul style="list-style-type: none"> <li>Classify dentition</li> <li>Differentiate different tooth numbering system</li> <li>Identify oral and other associated dental structures.</li> <li>Discuss typical tooth forms and alignment to their function</li> </ul>	IC 2	LGIS SGD	SEQs MCQs VIVA
		Practice safety measures during laboratory work	<b>Skills</b> <ul style="list-style-type: none"> <li>Explain Microscope function and parts</li> <li>Demonstrate parts of teeth on tooth models</li> </ul>	IC 4 IC 5	Demonstration	OSPE
			<b>Attitude</b> <ul style="list-style-type: none"> <li>Follow the proper dress code of a medical laboratory</li> <li>Handle microscopes and slides properly according to prescribed SOPS</li> <li>Switch off the microscope before leaving</li> </ul>	IC 1 IC 4 IC 5	Demonstration	OSPE





			<ul style="list-style-type: none"> <li>• Report any damage to laboratory equipment immediately</li> </ul>			
Week 02	Introduction and nomenclature	Discuss basic principles of nomenclature	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• Discuss typical tooth forms and alignment to their function and form the basis of</li> <li>• Discuss the physiologic considerations of teeth and their supporting structures</li> </ul>	IC 2	LGIS	MCQs SEQs VIVA Assignment
		Draw and label morphological features of teeth	<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>• Practice drawing features of teeth histology and morphology on the logbook</li> </ul>	IC 2 IC 4	Practical demonstration	OSPE



Week 03	Enamel	Explain the histological features of enamel	<b>Knowledge</b> <ul style="list-style-type: none"> <li>• Discuss the developmental and histomorphological stages of ameloblasts during amelogenesis</li> <li>• Discuss the developmental and histomorphological stages of ameloblasts during amelogenesis</li> <li>• Classify enamel proteins according to their function during amelogenesis</li> <li>• Draw and label stages of amelogenesis</li> </ul>	IC 2	LGIS SGD Presentations	MCQs SEQs VIVA
	Upper central incisor	Discuss the morphological features of incisors	<b>Skill</b> <ul style="list-style-type: none"> <li>• Demonstrate anatomical structures of central incisors</li> </ul>	IC 2 IC 4 IC 5	Demonstration Presentations	OSPE
Week 04	Enamel	Discuss the characteristics of enamel	<b>Knowledge</b> <ul style="list-style-type: none"> <li>• Describe the physical characteristics of enamel</li> <li>• Demonstrate anatomical structures of central incisors</li> </ul>	IC 2	SGD on models	MCQs SEQs VIVA OSPE



			<p><b><u>Attitude</u></b></p> <ul style="list-style-type: none"> <li>Maintain his/her workstation according to the prescribed SOPs</li> <li>Draw and label microscopic feature hunter Schreger band neonatal line and gnarled enamel</li> <li>Discuss surfaces of the upper central incisor</li> </ul>	IC 1 IC 4	Demonstrations	OSPE
Week 05	Enamel	Discuss the properties of enamel	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>Discuss Enamel composition and structure of enamel rod</li> <li>Discuss the mineralization pathway of enamel</li> <li>Discuss age-Discussd changes in enamel.</li> <li>Draw labelled diagram of dentinoenamel junction (DEJ), spindle, tufts, and Enamel Lamellae in pictures/ images</li> </ul>	IC 2 IC 4	LGIS SGD CBL	MCQs SEQs VIVA
			<p><b><u>Attitude</u></b></p> <ul style="list-style-type: none"> <li>Maintain good collaborative learning environment</li> </ul>	IC 2 IC 4	SGD	Formative assessment



	Upper lateral incisor	Discuss the morphological features of incisors	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>• Demonstrate anatomical structures of lateral incisors</li> <li>• Discuss surfaces of the upper central incisor</li> </ul>	IC 2	LGIS SGD	MCQs SEQs VIVA
			<b><u>Skill</u></b> <ul style="list-style-type: none"> <li>• Draw and label the lingual surface of the central incisor</li> </ul>	IC4 IC 5	Demonstration on models	OSPE
			<b><u>Attitude</u></b> <ul style="list-style-type: none"> <li>• Maintain good collaborative learning environment</li> </ul>	IC4 IC 5	SGD	Formative assessment
Week 06	Enamel	Explain the histomorphological features with clinical implications	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>• Discuss morphological, histological, environmental, and functional changes which occur in enamel due to ageing</li> <li>• Discuss the clinical implications of enamel ageing process</li> </ul>	IC 2	LGIS SGD /CBL	MCQs SEQs VIVA



	Dentine	Discuss the development of dentin and histological features of enamel	<b>Knowledge</b> <ul style="list-style-type: none"> <li>• Explain the process of dentinogenesis</li> <li>• Explain the process of dentinogenesis</li> <li>• Identify, draw, and label Enamel Spindles in pictures/images</li> <li>• Draw and label the upper lateral incisor</li> </ul>	IC 2	LGIS	MCQs SEQs VIVA
Week 07	Dentine	Discuss formation of dentin  Discuss different types of dentin	<b>Knowledge</b> <ul style="list-style-type: none"> <li>• Describe globular and linear mineralisation in terms of matrix vesicle formation and fusion</li> <li>• Describe the structure of dentinal tubules and composition of dentine</li> <li>• Differentiate between different types of dentine</li> <li>• Differentiate between different types of dentine</li> </ul>	IC 2	LGIS Demonstrations	MCQs SEQs VIVA
			<b>Skill</b> <ul style="list-style-type: none"> <li>• Draw the different types of dentine</li> </ul>	IC 2 IC 5	Demonstration	OSPE



	Upper Lateral Incisor	Discuss models of incisors	<b>Knowledge</b> <ul style="list-style-type: none"> <li>• Demonstrate anatomical structures of lateral incisors</li> <li>• Discuss upper lateral incisor using model</li> </ul>	IC 2	SGD	MCQs SEQs VIVA OSPE
Week 08	Dentine and Pulp	Discuss dentine pulp complex	<b>Knowledge</b> <ul style="list-style-type: none"> <li>• Discuss age changes /dentine sensitivity</li> <li>• Discuss the growth line of dentine</li> <li>• Describe the names, location, content, and function of four histological zones seen in dental pulp under the microscope.</li> </ul>	IC 2	LGIS Demonstrations/SGD	MCQs SEQs VIVA
	Lateral incisor	Discuss upper and lower incisors	<ul style="list-style-type: none"> <li>• Differentiate between upper central and lateral incisors.</li> </ul>	IC 2		



Week 09	Pulp	Discuss the structure and age-related changes of pulp with clinical correlation	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>Identify four histological zones of the dental pulp as seen in images/slides</li> <li>Discuss the cell of pulp</li> <li>Discuss the odontoblast structure and age</li> <li>Discuss changes in pulp</li> <li>Describe types, location and clinical significance of pulp stones</li> </ul>	IC 2	LGIS SGD	MCOs SEQs VIVA
			<b><u>Skills</u></b> <ul style="list-style-type: none"> <li>Identify functional odontoblastic cells at higher magnification</li> </ul>	IC 4 IC 5	Laboratory Demonstration	OSPE
Week 10	Lower central and lateral incisor	Discuss the gross morphology of incisors	<b><u>Knowledge</u></b> <ul style="list-style-type: none"> <li>Discuss lower central incisor on model</li> <li>Discuss lower lateral incisor on model</li> </ul>	IC 2	SGD	OSPE
			<b><u>Skills</u></b> <ul style="list-style-type: none"> <li>Draw and label the lingual surface of the upper lateral incisor</li> </ul>	IC 4 IC 5	Demonstration	OSPE



	Bone	Explain the gross anatomical features of Bone	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Describe composition, function, regulation, remodelling (phases, normal turnover rate in cortical and trabecular bone, turnover rate in children/adults/ old age) and age changes and repair and regeneration of bone</li> </ul>	IC 2	LGIS SGD	MCQs SEQs VIVA
			<p><b>Skill</b></p> <ul style="list-style-type: none"> <li>Draw and label compact bone histology</li> </ul>	IC 2 IC 4 IC 5	Demonstration	OSPE
Week 11	Bone	Discuss the histological features of bone	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Explain the basic and histological structure, composition, development, and physiology of bone along with its clinical correlation</li> <li>Explain the bony repair following tooth extraction</li> </ul>	IC 2	LGIS	MCQs SEQs VIVA
			<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Classify bone</li> </ul>	IC 2	LGIS	MCQ SAQ





			<b>Skill</b> <ul style="list-style-type: none"> <li>• Draw and label a histological picture of the bone</li> </ul>	IC 4 IC 5	Demonstration	OSPE
Upper and lower central incisor differences	Differentiate upper and lower incisors	<b>Knowledge</b> <ul style="list-style-type: none"> <li>• Differentiate between upper and lower central incisors</li> <li>• Demonstrate anatomical structures of lower central incisors</li> </ul>	IC 2	LGIS	MCOs SEQs VIVA	
		<b>Skills</b> <ul style="list-style-type: none"> <li>• Draw and label the lingual surface of the lower central and lateral incisor</li> </ul>	IC 2 IC 4 IC 5	Laboratory demonstration	OSPE	
	Practice safety during laboratory work	<b>Attitude</b> <ul style="list-style-type: none"> <li>• Follow the proper dress code of a medical laboratory</li> <li>• Demonstrate protocols for proper handling of microscopes and slides properly according to prescribed SOPS</li> <li>• Switch off the microscope before leaving</li> <li>• Report any damage to laboratory equipment immediately</li> </ul>	IC 1 IC 4	Demonstration	OSPE	



## Vertically Integrated Modules

### 1. Research Methodology

S. No.	Topic/Theme	Learning Outcomes	Learning Objectives	Instructional Strategies	IC Codes
1.	<b>Introduction to Research</b>	Discuss the historical background of research in medicine	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Define research</li> <li>• Describe the historical background of research</li> <li>• Discuss important terminologies regarding research</li> </ul>	LGIS	IC 2
2.	<b>Importance of Research</b>	Discuss the significance of research in medicine	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Describe the importance of evidence-based practice</li> <li>• Apply the knowledge of research in health sciences</li> </ul>	LGIS	IC 2
3.	<b>Introduction to Research Process</b>	Explain the process and requirements of good research for a doctor	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Describe an overview of process of research</li> <li>• Discuss the characteristics of a good research</li> <li>• Illustrate the qualities of a good researcher</li> </ul>	LGIS	IC 2
4.	<b>Types of Research</b>	Classify different types of research and their applications	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>• Describe the characteristics of basic and applied research</li> <li>• Differentiate between quantitative and qualitative research</li> <li>• Discuss the characteristics of observational and interventional research</li> </ul>	LGIS	IC 2



## 2. Behavioural Sciences

Topic/Theme	Learning Outcomes	Learning Objectives	IC Codes	Instructional Strategies
Healthcare Models and their Application	Outline Healthcare models in clinical practice	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Discuss Eco- Bio Psycho-Social Model in clinical practice</li> </ul>	IC 2	LGIS
Medical Ethics and Professionalism	Discuss medical ethics and professionalism	<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Differentiate favorable and unfavourable attitudes in clinical practice</li> <li>Discuss ethical and scientific skills of taking information from patients and assimilating it to others at clinical setups</li> <li>Demonstrate skills like breaking bad news and handling death. terminally ill patients, carrying out effective crisis intervention</li> </ul>	IC 2	LGIS
		<p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>Take consent for examination (non- intimate/ intimate) and performing procedures (drawing blood, administering injections/ IV lines, lumbar puncture etc.)</li> <li>Maintaining patient privacy and confidentiality</li> </ul>	IC 2	LGIS



		<ul style="list-style-type: none"> <li>Examining procedures on the anesthetized patient</li> </ul>		
Central and peripheral nervous system	Discuss the basic structure and function of the central and peripheral nervous system	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>Examine the structure and function of the nervous system</li> <li>Analyze the function of neurons and neurotransmitters</li> </ul>	IC 2	LGIS
Health belief Model	Discuss the Health belief model with its clinical relevance	<p><b><u>Knowledge</u></b></p> <ul style="list-style-type: none"> <li>Explain the health belief model and explanatory models of health and illness</li> <li>Interpret illness narratives told by patients</li> </ul>	IC 2	LGIS



Medical Anthropology	<ul style="list-style-type: none"><li>• Assess the impact of culture on global, national and local health care systems</li><li>• Recognize the value of society on medical approaches</li></ul>	<b><u>Knowledge</u></b> <ul style="list-style-type: none"><li>• Discuss the role of healing and healers in society</li><li>• Analyze the impact of religion, psychology, culture and anthropology in understanding medicine and healing.</li><li>• Analyze disease, sickness, illness, and human life cycle from cultural aspects.</li></ul>	IC 2	LGIS
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## Block I Syllabi

### Physiology

Sr. No.	Week	Topic Name	MIT
1.	1	Homeostasis	LGIS
2.	1	Cell transport	LGIS
3.	1	Cell membrane	LGIS
4.	1 & 2	Cell organelles	LGIS
5.	2	Resting membrane potential	LGIS
6.	2	Action potential	LGIS
7.	2	Saltatory conduction	LGIS
8.	2& 3	Physiological anatomy of skeletal muscles	LGIS
9.	3	Mechanism of Skeletal muscle contraction	LGIS
10.	3	NMJ	LGIS
11.	3 & 4	Types of Muscle Fibers + Properties of Muscle control	LGIS
12.	3 & 4	Smooth muscle contraction	LGIS
13.	4	Differences between Skeletal and Smooth muscle contraction	LGIS
14.	4	Introduction to the CVS	LGIS
15.	4	Cardiac muscle as a Functional Syncytium	LGIS
16.	4 & 5	Action Potentials in Cardiac muscles	LGIS
17.	5	Impulse Transmission in Cardiac muscles	LGIS
18.	5	Differences between Cardiac, Skeletal, and Smooth muscles	LGIS
19.	5	Cardiac cycle	LGIS
20.	5	Autonomic regulation of Heart pumping	LGIS
21.	6	Acute and Chronic control of blood flow and its regulation	LGIS
22.	6	Short term regulation of Blood pressure	LGIS



23	6	ECG (2 sessions) Practical + Lecture	LGIS
24	7	Long term regulation of Blood pressure	LGIS
25.	7	Cardiac Output	LGIS
26.	7	Determinants of Arterial Blood pressure	LGIS
27.	9	Venous Return	LGIS
28.	9	Coronary Circulation	LGIS
29.	9	Circulatory Shock	LGIS
1.	To be decided	Microscope	Practical/SGD
2.	To be decided	Record BP measurement using Palpatory and Auscultatory method	Practical/SGD
3.	To be decided	Effect of posture and exercise on Blood Pressure	Practical/SGD
4.	To be decided	Examination of Radial Pulse	Practical/SGD
5.	To be decided	Examination of Heart Sounds	Practical/SGD
6.	To be decided	Recording of normal ECG	Practical/SGD
7.	To be decided	Haematocrit estimation	Practical/SGD
8.	To be decided	Calculate the Red Cell indices	Practical/SGD
9.	To be decided	Studying the Neubauer's Chamber using a compound microscope	Practical/SGD
10.	To be decided	Haemoglobin estimation using Sahli's method	Practical/SGD



## **Oral**

### **Biology**

Topics	MIT
<b>Week -01 (07-02-22 to 11-02-22)</b>	
Classify Dentition	LGIS
Numbering system	LGIS
Alignment of teeth form and function	LGIS
Teeth and supporting structure	LGIS
Microscope function and parts	SGD
Demonstration of tooth models	SGD
Dental Anatomy of lobes crown surface forms	LGIS
Curves of Spee of Wilson sphere of Monson	LGIS
Contact areas embracers line angles	LGIS
Contour cervical lines occlusion anatomy root shapes	LGIS
Explain how to draw on histology and morphology on the logbook	Practical
Draw and label surfaces of upper central incisor	Practical
Amelogenesis (Part 1)	LGIS
Amelogenesis (Part 2)	LGIS
Enamel Protein	LGIS





Central incisor	LGIS
Draw and label stages of amelogenesis	Practical
Discuss surfaces of the upper central incisor	SGD
<b>WEEK-04 (28-02-22 to 04-03-22)</b>	
The physical characteristic of enamel	LGIS
Upper central incisor	LGIS
Histological features of Enamel (Part 1)	LGIS
Enamel Proteins (Part 1)	LGIS
Draw and label microscopic features hunter Schreger band neonatal line gnarled enamel	Practical
Discuss the surface of the upper central incisor	Practical
<b>WEEK-05 (07-03-22 to 11-03-22)</b>	
Histological features of Enamel (Part 2)	LGIS
Histological features of Enamel (Part 3)	LGIS
Age-Discussd changing enamel	LGIS
Upper central lower incisor	LGIS
Identify, draw and label DEJ, spindle tufts and enamel lamella in pictures/images	Practical
Discuss surfaces of the upper central incisor	SGD
Lower central incisor (Part 1)	LGIS
Lower central incisor (Part 2)	LGIS
Enamel Protein (Part 2)	LGIS



Enamel Spindles	SGD
Draw and label the upper lateral incisor	Practical
Dentinogenesis	LGIS
Types of Dentin	LGIS
Pulp location content function	LGIS
Tooth Morphology Max Lateral	LGIS
Discuss the zones of pulp	LGIS
Discuss the odontoblast structure and age-Discussd changes in pulp	LGIS
Composition of Dentin	LGIS
Draw and label Dentinogenesis, zones of pulp and odontoblast	Practical
Discussion on the laboratoryial surface of the central incisor	SGD
Bone composition function	LGIS
Classification of bone	LGIS
Composition and development of bone	LGIS
Physiology of bone	LGIS
Histology of bone	Practical
Lingual surfaces of central incisors	SGD



## **Anatomy**

<b>Sr. No</b>	<b>Topics</b>	<b>Sub-Discipline</b>	<b>MITs</b>
<b>WEEK-1</b>			
1.	Cell shapes	Histology	Practical
2.	Terms of plane and position	General anatomy	LGIS
3.	Terms of planes and position-II	General anatomy	LGIS
4.	Gametogenesis- I	Embryology	LGIS
5.	Cervical Vertebrae-I	Gross anatomy	SGD
6.	Cervical vertebrae-II	Gross anatomy	SGD
7.	Cranial Nerves	Neuroanatomy	IMLC
8.	Cranial Nerves	Neuroanatomy	IMLC
<b>Week 2</b>			
1.	Epithelium	Histology	Practical
2.	Epithelium	Histology	LGIS
3.	Gametogenesis-II	Embryology	LGIS
4.	Deep cervical fascia	Gross anatomy	SGD
5.	Deep cervical fascia-II	Gross anatomy	SGD
6.	Cranial nerves	Neuroanatomy	IMLC
7.	Cranial nerves	Neuroanatomy	IMLC



		<b>WEEK 3</b>	
1.	Bone/ Cartilage	Histology	LGIS
2.	Bone/ Cartilage-II	Histology	LGIS
3.	Epithelium	Histology	Practical
4.	Gametogenesis-III	Embryology	LGIS
5.	Deep cervical fascia	Gross anatomy	SGD
6.	Muscles of the neck	Gross anatomy	SGD
7.	Cranial nerves	Neuroanatomy	IMLC
8.	Cranial nerves	Neuroanatomy	IMLC
		<b>WEEK 4</b>	
1.	Bone/ Cartilage	Histology	LGIS
2.	Conn1 ective tissue cells	Histology	Practical
3.	The first week of development	Embryology	LGIS
4.	Joints	General anatomy	LGIS
5.	Triangles-I	Gross anatomy	SGD
6.	Triangles-II	Gross anatomy	SGD
7.	Cranial Nerves	Neuroanatomy	IMLC



8.	Cranial nerves	Neuroanatomy	IMLC
		<b>WEEK 5</b>	
1.	Joints	General anatomy	LGIS
2.	Joints	General Anatomy	LGIS
3.	Connective tissue	Histology	Practical
4.	The first week of development	Embryology	LGIS
5.	Triangles-III	Gross anatomy	SGD
6.	Vessels of the neck	Gross anatomy	SGD
7.	Cranial nerves	Neuroanatomy	IMLC
8.	Cranial nerves	Neuroanatomy	IMLC
		<b>WEEK 6</b>	
1.	Cartilage	Histology	Practical
2.	The second week of development	Embryology	LGIS
3.	Muscle	Histology	LGIS
4.	Lymphatic drainage	Gross anatomy	SGD
5.	Lymphatic drainage-II	Gross anatomy	SGD



6.	Cranial nerves	Neuroanatomy	IMLC
		<b>WEEK 7</b>	
1.	Muscle-II	General anatomy	LGIS
2.	The second week of development	Embryology	LGIS
3.	Viscera of the neck	Gross anatomy	SGD
4.	Cranial nerves	Neuroanatomy	IMLC
5.	Cranial nerves	Neuroanatomy	IMLC
		<b>WEEK 8</b>	
1.	Circulatory system	General anatomy	LGIS
2.	Third week of development	Embryology	LGIS
3.	Circulatory system-II	Embryology	LGIS
4.	Viscera's (Thyroid and parathyroid)	Gross anatomy	SGD
5.	Larynx	Gross anatomy	SGD
6.	Cranial Nerves	Neuroanatomy	SGD
		<b>WEEK 9</b>	
1.	Third week of development-II	Embryology	LGIS



2.	Circulatory system	General anatomy	LGIS
3.	Larynx	Gross anatomy	SGD
4.	Larynx-II	Gross anatomy	SGD
		<b>WEEK-10</b>	
1.	Circulatory system	General anatomy	LGIS
2.	Development of neck	Embryology	LGIS
3.	Circulatory system (Heart/Lungs)	General anatomy	LGIS
4.	Larynx-III	Gross anatomy	SGD
5.	Parotid Region	Gross anatomy	SGD
		<b>WEEK-11</b>	
1.	Skin	Histology	LGIS
2.	Development of Face	Embryology	LGIS
3.	Parotid Gland-I	Gross anatomy	SGD
4.	Parotid Gland-II	Gross anatomy	SGD
5.	Sub-occipital Triangle	Gross anatomy	SGD



## **Biochemistry**

<b>S. No.</b>	<b>Week</b>	<b>Introduction</b>	<b>MIT</b>
1	1	Biochemistry of cell	LGIS
2	2	Biochemistry of cell	LGIS
3	3	Biological Membranes - I	LGIS
4	3	Biological Membranes - II	LGIS
5	4	Membrane Transport Mechanism	LGIS
6	4	Biochemistry of body Fluids	LGIS
7	4	Biochemistry of body Fluids	LGIS
8	4	Buffers	LGIS
9	4	Acid Base Disorders	LGIS
10	4	Osmosis, Surface tension viscosity	LGIS
11	5	Protein Chemistry-I	LGIS
12	5	Classification of Proteins	LGIS
13	5	Amino Acid Structure & Function	LGIS
14	5	A.A Classification & Properties of Protein Structure	LGIS
15	5	Nucleotide Chemistry	LGIS
16	6	Plasma Proteins	LGIS
17	6	Nucleotide Chemistry-I	LGIS
18	7	Classification of Enzymes	LGIS
19	7	Mechanism of Action Enzymes	LGIS
20	7	Factor Affecting Enzyme	LGIS
21	7	Enzyme inhibition	LGIS
22	7	Enzyme inhibition	LGIS
23	7	Enzyme	LGIS
24	7	Clinical Enzymology	LGIS
25	8	Immunoglobulins	LGIS





26	8	Nutrition	LGIS
28	8	Nutrition - I	LGIS
29	8	Fat Soluble Vitamins	LGIS
34	8	Water Soluble Vitamins	LGIS
37	9, 10	Globular Proteins	LGIS
40	11	Carbohydrate Chemistry	LGIS

### **Behavioural Sciences**

<b>Week</b>	<b>Topic/ Theme</b>	<b>MIT</b>
Week 04	Healthcare models and their application	LGIS
Week 05	Healthcare models and their application	LGIS
Week 06	Medical ethics and professionalism	LGIS
Week 07	Medical ethics and professionalism	LGIS
Week 08	Medical ethics and professionalism	LGIS
Week 09	Medical ethics and professionalism	LGIS
Week 10	Medical ethics and professionalism	LGIS
Week 11	The neurological basis of behaviour	LGIS
Week 12	The neurological basis of behaviour	LGIS



**Research**  
**Methodology**

Sr. No.	Week	Topic / Theme	MIT
<b>1<sup>st</sup> Block</b>			
1.	Week 3	Introduction to research and its importance	LGIS
2.	Week 4	Introduction to the research process and types	LGIS
<b>2<sup>nd</sup> Block</b>			
3.	Week 16	Identification & formulation of a good research problem & question(s)	LGIS
4.	Week 17	Developing quality study title, rationale & objectives with their justification	LGIS
5.	Week 18	Introduction to data and types of variables	LGIS
<b>3<sup>rd</sup> Block</b>			
6.	Week 31	Conducting quality literature search & performing a literature review	LGIS
7.	Week 32	Developing quality research hypotheses based on practical operational definitions	LGIS



## Learning Resources

### 1. Physiology

#### TEXTBOOKS

1. Guyton and Hall  
Textbook of Medical Physiology 14<sup>th</sup> Edition.

#### REFERENCE BOOKS

2. Mushtaq Ahmed Essentials of Medical Physiology Vol. 1 and 2 5<sup>th</sup> Edition
3. Lauralee Sherwood Human Physiology 9<sup>th</sup> Edition.

#### PRACTICAL JOURNAL

4. Laboratory Manual in Physiology

### 2. Anatomy

Gross Anatomy	
Textbooks	Reference Books
Clinical Anatomy for medical students By Richard S. Snell (9th Edition)	LAST's Anatomy regional & applied ( 12th Edition)
Clinical Neuroanatomy By Richard S. Snell (7th Edition)	Gray's Anatomy By Henry Gray (40th Edition)
Cunningham's manual of practical anatomy Vol-3 (head& neck and brain)15th Edition	Atlas of Anatomy By Grant's By Netter ( 6th Edition)
Embryology	
Textbooks	Reference Books
Langman's Medical Embryology (13 <sup>th</sup> Edition)	Netter's Embryology Atlas



The Developing Human By Keith L-Moore (10th Edition)	
<b>Histology</b>	
Medical Histology By Prof Laiq Hussain (7th Edition)	Histology by Michel H. Ross (6th edition)
Basic Histology By Luiz Carlos Junqueira (14th Edition)	
Di-Fiore's Atlas of Histology (12th Edition)	
<b>Neuroanatomy</b>	
Snell's Neuroanatomy	
<b>OTHER LEARNING RESOURCES</b>	
Hands-on activities	Students will be involved in practical sessions and hands-on learning activities to enhance their learning
Laboratory Museum and dissection hall	Students will utilize the laboratory to Discuss textbook knowledge to specimens and prosecutions
Videos/CD's/DVDs, Internet Resources	Animated videos of dissections and developmental anatomy are available to reinforce the concepts
Self-Directed Learning	Self- Study is incorporated to help students manage individual tasks and assignments.

### **3. Oral Biology**

- 1) BERKOVITZ 5 T.H. edition
- 2) ORAL HISTOLOGY TENCAT'S (Antonio Nancie 9th edition)
- 3) TOOTH MORPHOLOGY (Wheeler's 9th Edition)



4) CONCISE DENTAL ANATOMY AND MORPHOLOGY / James L. Fuller, Gerald E. Denehy

#### **4. Biochemistry**

- 1) Lippincott's Illustrated Review, Latest edition William and Wilkins publishers
- 2) Harpers illustrated Biochemistry, the Latest Edition McGraw Hill publishers.
- 3) Textbook of Medical Biochemistry by Chatterjee. Latest Edition



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