DENTAL COLLEGE HITEC-IMS

1st Year BDS

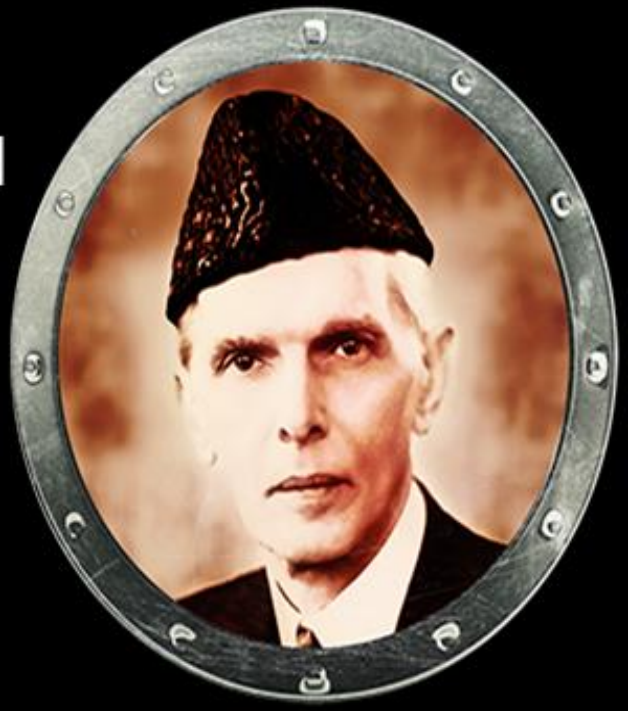
(Life Systems Integration) Block I

(Study Guide (2024))

(Version-I)

With faith, discipline and selfless devotion to duty, there is nothing worthwhile that you cannot achieve.

Muhammad Ali Jinnah



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List of Abbreviations

- PMC Pakistan Medical Commission
- NUMS National University of Medical Sciences
- LGIS Large Group Interactive Session
- SGD Small Group Discussion
- SDL Self-Directed Learning
- CBL Case Base Learning
- MIT Mode of Information Transfer
- EOB End of Block Examination
- TOS Table of Specification
- OSPE Objectively Structured Practical Examination
- OSCE Objectively Structured Clinical Examination
- SEQ Structured Essay Questions
- SAQ Short Answer Question
- MCQ Multiple Choice Question
- EECS Early Exposure to Clinical Skills
- FGD Focus Group Discussion
- WFME World Federation of Medical Education
- OMFS Oral & Maxillofacial Surgery
- MDT Multi-Disciplinary Team
- CSSD Central Sterile Supply Department
- LA Local Anaesthesia
- OSSC Oral Squamous Cell Carcinoma
- H & E Haematoxylin And Eosin

Institutional Vision & Mission

Vision

- **Leading advancement in oral & dental health through excellence in education, patient care and research**

Mission

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

NUMS Vision

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

Block Committee

Year Coordinator: Dr Saman Malik

Assistant Professor

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S. No.	Name	Designation	Department	Contact No.
1.	**Dr. Waheed ullah Khan**	Professor	Vice Principal	0333-5206136
2.	**Dr. Ayesha Zafar**	Assistant Professor	Physiology	0336-5601133
3.	**Dr. Ayesha Yasir**	Assistant Professor	Anatomy	0335-0580024
4.	**Dr. Ambreen Gul**	Associate Professor	Biochemistry	0300-5905179
5.	**Dr. Saman Malik**	Assistant Professor	Oral Biology	0312-3456303
6.	**Dr. Faizan Munir**	Assistant Professor	Dental Education	0334-0031031
7.	M Umer Farooq	Student	1st year	0311-7793683
8.	Iqra Fatima	Student	1st year	0313-6804872

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, so that our students, on completion of the program, have the required competencies as defined worldwide in a graduate doctor.

Curricular Model

The curriculum of Dental College, HITEC-IMS, has been recently revised standards by the Pakistan Medical and Dental Council (PM&DC) that encourages integration of major subjects both horizontally and longitudinally. We have also incorporated some elements of SPICES model i.e., its student-centred, integrated, community-oriented and systematic aspects and as well as of spiral model. As a result, our curriculum has evolved, considering, experiential, behavioural, constructivist and attributional perspectives of curricula.

Organization

The curriculum is organized and integrated at level 7 of Harden's level of integration to bring together areas of interest common to each of the subjects. The content taught is integrated concurrently in the horizontal organization and vertically across the years of the BDS Program. The course of the 1st 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 and understanding, and to standardise the delivery of the concepts. It helps them to understand the general theme or subject matter, updated research, and best evidence medical/dental information. We are teaching clinical implications of each topic to integrate basic and clinical sciences through CBLs and PBLs. This encounter is based on experience that is contextual, realistic and relevant. Small group discussions encourage students to learn socially and refine their schemas. Working in wards and clinical departments provides a hands-on and real life, contextual learning experience.

Assessment

There will be two end of blocks and one pre-annual examination in year I, which contributes towards the weighting of internal assessment i.e 20% in first professional BDS Examination. There will be no 3rd EOB exam. The students are summatively assessed by end-block and pre-annual examinations. Constructive feedback is provided via formative assessments by assignments, presentations, CBL and class tests. At the end of the academic year, annual professional examination is conducted according to the standards outlined by NUMS.

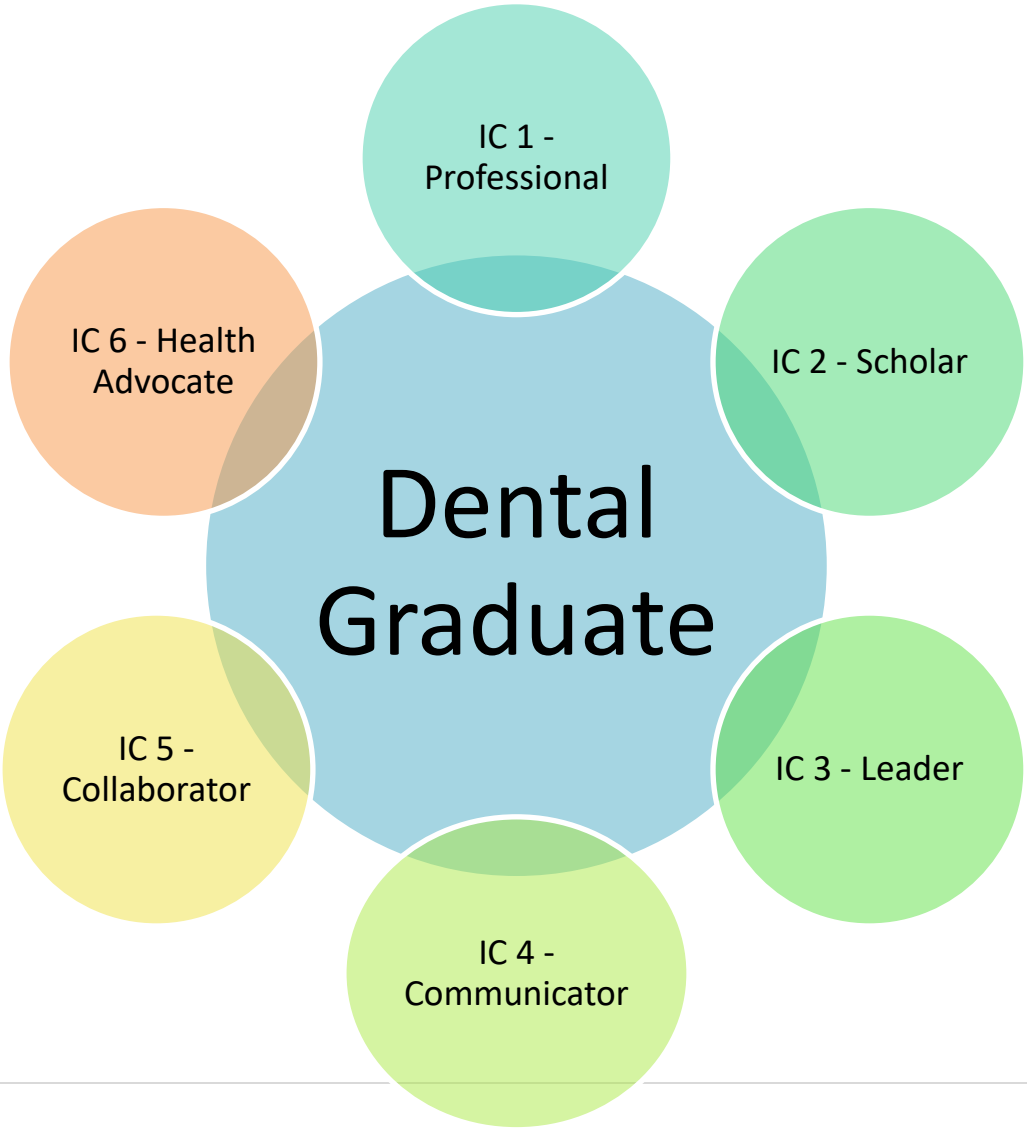
- Internal Examination (20% weightage)
- Annual Professional Examination (80% weightage)

There will be a total of five papers in first Professional exam. Paper I, II, III for each block of basic medical subjects with total 40 Marks of each subject in each paper. Paper IV will comprise of all blocks of dental subjects. Paper V will be of Islamiyat and Pakistan Studies. It is mandatory to secure min. 50% marks in each subject in prof papers (I, II, III & IV) in theory and practical separately.

MARKS distribution

- MCQ's: SEQs/SAQs in 70: 30 ratios.
- There will be 4 x Integrated Practical Exam and structured viva block wise of 150 Marks each.
- English will be assessed by the institute itself. Pass marks will be 50%.

Institutional Competency Framework



Alignment of Block Outcomes with Institutional Competencies

S No.	Block Outcomes	Block Outcome Code	Institutional Competencies
1.	Correlate the anatomy of cells and their biochemical reactions with its application in clinical practice	Y1-B1-O1	IC 1 to IC 6
2.	Relate the histology of nerve, bone, and muscle with its function along with clinical relevance	Y1-B1-O2	IC 2 to IC 6
3.	Discuss the anatomical and histological features of hard and soft tissues, including the head and neck region	Y1-B1-O3	IC 2
4.	Integrate the fundamental concepts of social and behavioral sciences with knowledge of other medical subjects	Y1-B1-O4	IC 1, IC 2, IC 6
5.	Apply the principles of research for writing research proposals	Y1-B1-O5	IC 2, IC 4, IC 5, IC 6
6.	Analyze multiple perspectives of Pakistan studies and Islamiyat	Y1-B1-O6	IC1, IC 2
7.	Correlate the embryological development of head and neck structures with embryological layers with its neural, muscular, and skeletal components	Y1-B1-OC7	IC 2 to IC 6
8.	Correlate the gross anatomical, morphological, and light microscopic features of head and neck and oral structures including the hard and soft tissues	Y1-B1-OC8	IC 1 to IC 6

Calculation & Distribution of Academic Contact Hours

Summary of MITs Along with Distribution of Hours

Subject	MIT	No.	Hours In 13 weeks
Physiology	LGIS	53	44
	CBL/SGD	11	22
	Integrated sessions	12	24
	Practical	11	39
	Total hours =		**129**
Biochemistry	LGIS	44	37
	CBL	1	2
	Integrated sessions	6	12
	Practical	11	39
	Total hours =		**90**
Anatomy	LGIS	43	40
	CBL/PBL	2	3
	SGD	19	47
	Integrated sessions	4	8
	Practical	11	39
	Total hours =		**137**
Oral Biology	LGIS	44	42
	CBL/PBL	1	1
	SGD	20	34
	Integrated sessions	5	6
	Practical	20	34
	Total hours =		**117**
Leader Ship & Management	LGIS	4	5
Islamiyat /Pak Studies	LGIS	10	7
QURAN KAREEM	LGIS	8	6
ICT	LGIS	6	14.5
Introduction to Research	LGIS	2	4

Structured Summary of Block I

Code	Y1-B2-D24
Name	Life Sciences Integration
Duration Of Block	14 (1+3+9+1)
Important Dates	11 academics 1 week (Eid ul Fitr)2 ,2 block exam
Horizontally Integrated Themes	
Vertically Integrated subjects	Science of dental materials, Pre-clinical Operatives, Oral Pathology, Operative, OMFS, Orthodontics, Anatomy
Prerequisite Block(s)	FSc

Academic Calendar

Academic Event	Duration
Commencement of New Academic Year	**6th February 2024**
Orientation day	**13th February 2024**
FIRST TERM (12 Weeks)	
Academics 3/12Weeks	**12th February 2024 to 04th March 2024**
Sports Week	**26 February 2024 to 3rd March 2024**
Academics 9/12 Weeks	**4th March 2024 to 18th May 2024**
Public Holiday	**23rd March (Pakistan day)**
Eid ul Fitr Holidays (1 Week)	**08thApril 2024 to 14th April 2024**
1st Term exam	**20th May 2024 to 2nd June 2024**
SECOND TERM (10 Weeks)	
Academics 2/10 Weeks	**3rd June 2024 to 16th June 2024**
Summer Vacations + Eid ul Azha (3 Week)	**17th June 2024 to 7th July 2024**
Academics 8/10 Weeks	**8th July 2024 to 1st September 2024**
Public Holiday	**16th – 17th July (Ashura) 14th August (Independence day)**
2nd Term Exam	**2nd September 2024 to 8th September 2024**
THIRD TERM (09 Weeks)	
Academics 9/9 Weeks	**9th September 2024 to 6th November 2024**
Send up / Pre Prof Exam (2 Weeks)	**11th November 2024 to 22th November 2024**
Prep Leaves for Prof (23 days)	**22th November 2024 to 15th December 2024**
Final Professional Exam	**16th December 2024 As proposed by NUMS**

Sample Timetable

Day/ Time	8:30-9:20	9:20-10:30	10:30 10:50	10:50-11:40	11:40-12:20	12:20 12:40	12:40 -1:50	1:50-3:30
Monday 15-4-24							**PRACTICAL /SGD** **Batch A –** PHYSIOLOGY **Batch B -** ANATOMY **Batch C -** BIOCHEMISTRY	**Batch A :** Histology **Batch B** :Morphology
	Biochemistry	Oral Biology		Physiology & Anatomy				**SGD** Dr Omair & Dr Khadija ORAL BIOLOGY
	8:30-9:20	**9:20-10:00**		**10:50-11:40**	**11:40-12:20**			
Tuesday 16-4-24							**PRACTICAL/SGD** **Batch B -** PHYSIOLOGY **Batch C -** ANATOMY **Batch A -** BIOCHEMISTRY	**Batch A :** Morphology **Batch B** : Histology
	Biochemistry	Biochemistry		Physiology	Oral Biology			**SGD** Dr Omair & Dr Khadija ORAL BIOLOGY
	8:30-9:20	**9:20-10:10**		**10:30- 11:20**	**11:20-12:10**	**12:10 12:30**	**12:30-1:20**	**1:20-2:00**	**2:00-3:30**
Wednesday 17-4-24								**Miss Kainat**	
	Physiology	Biochemistry		Physiology	Anatomy		Anatomy	Islamiyat / Pak Studies	Oral Path & Oral Bio
Thursday 18-4-24							**PRACTICAL/SGD** **Batch C** PHYSIOLOG **Batch A -** ANATOMY **Batch B** BIOCHEMISTRY		
	Anatomy			Biochemistry	Physiology				Physiology
	8:30-9:20	**9:30-10:10**	**10:10-11:20**		**11:20-12:10**	**12:10-1:00**		**1:00-1:50**	**1:50-3:30**
Friday 19-4-24								**Quran + Break**	**ICT**
	Oral Biology	Biochemistry	Anatomy		Physiology	ORAL BIOLOGY & ORALPATHOLOGY		Dr Nousheen	LGIS Dr Ayesha

Focus Group Discussion for Improvement of Curriculum

(Focus Group Discussion for Improvement of Curriculum

Basic Evaluation Report & Resultant Modifications

To assess the effectiveness of the same block run last year, a focus group discussion with students of the 2nd Year BDS was held. The students were selected on the merit of their academic records. They were informed about the purpose of the discussion, and they all consented willingly.

1.Focus Group Discussion (FGD)

The appropriate prompts generated discussion on various topics by all 1st Year HODs who conducted this FGD. The following areas were covered in the FGD:

2.Distribution of the Course Content

When new integrated university curriculum was shown to students they raised concern that this will be too much for students. they were of the opinion that clinical subjects integrated with basic sciences will result in cognitive overload. However, they were satisfied with LO's of previous year

3.Appropriateness of Chosen MITs for Different Content Areas

Students preferred LGIS and CBL and were fully satisfied by efforts of faculty

4.Teaching Methodology

Students were satisfied with mode of teaching that has been used. They mentioned that material and videos shared on google classroom were helpful and 1st year students should utilize them if they encounter any difficulty while learning

5. Assessment Methods

When Students read the integrated assessment of all medical basic science subjects, they were of opinion that for them it was difficult to cover one subject for one subject paper. the horizontally integrated paper might increase student's failure rate based on personal experience and due to cognitive overload.

6.Communication and Role of Resource Persons

Students agreed that the study guide was distributed on time, and it was beneficial for them to schedule time. In addition, any problem regarding curriculum was timely addressed by the year coordinator.

Announcements regarding changes in the timetable were timely communicated. In addition, all the timetables across the block were appropriately managed and followed.

Assessment

Types and Schedules

Assessment will be continuous in the form of class tests, presentations, and assignments by the departments. It is for the purpose of giving feedback to students for the improvement of their learning and helping teachers to identify students' weak areas. Formative assessment tests may be surprise tests/ written assignment/ reflective writing, presentations, and feedback to student during the teaching time. The purpose of formative assessment is to provide feedback to the students, for the purpose of improvement and to teachers to identify areas where students need further guidance.

The class tests of oral medicine, periodontology, oral pathology, general surgery, and general medicine will be held on rotation basis respectively.

The EOB exam will comprise of theory and practical separately.

All these assessments along with pre annual assessment will contribute marks in internal assessment that is to be submitted to university.

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

Internal assessment criteria for submission of internal assessment marks of 3rd Professional Examination NUMS

1. The weightage of internal assessment shall be 20 marks for a 100 marks paper (20%) in annual examination.
2. End of block and Pre - annual examination shall contribute toward internal assessment.

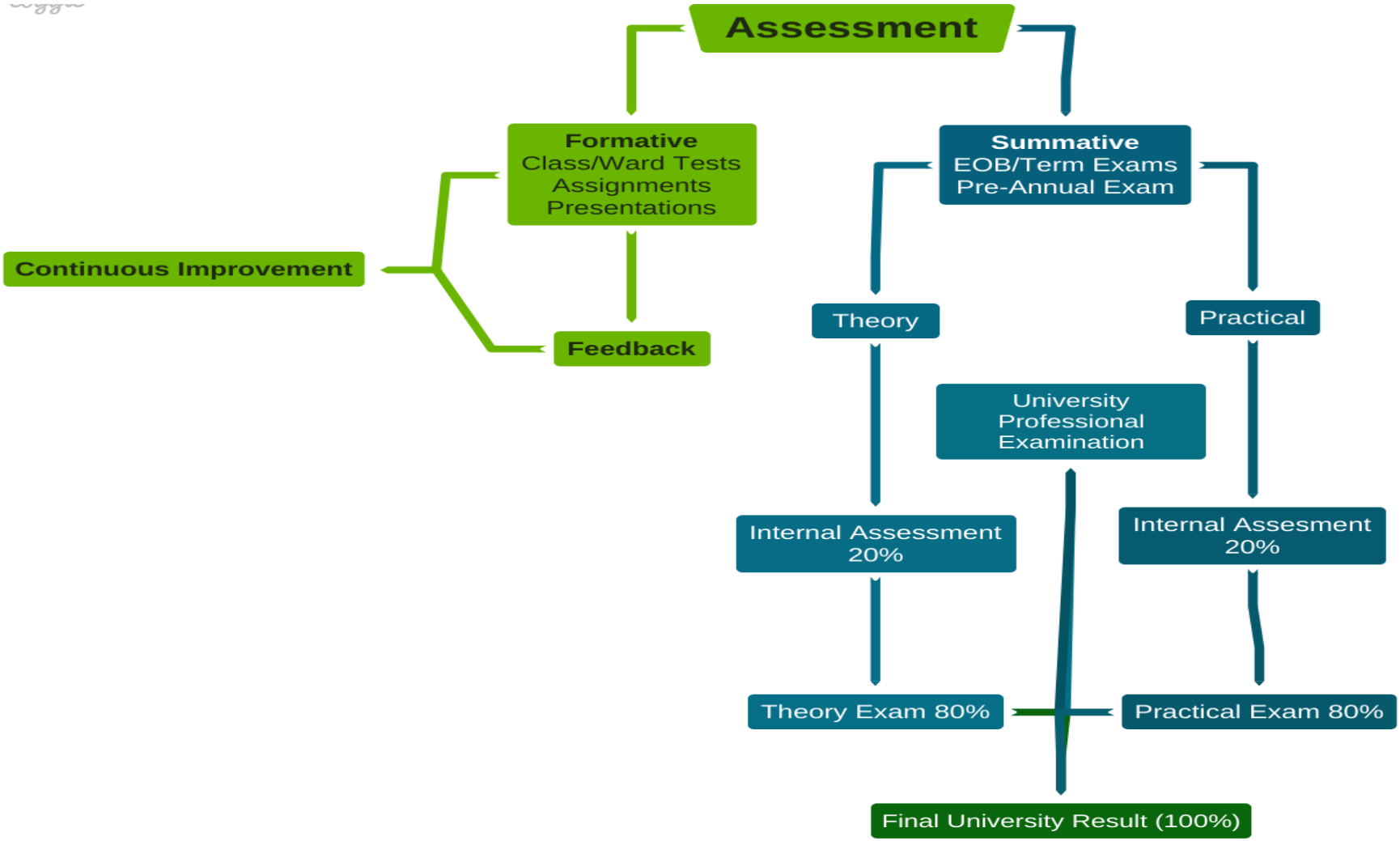
Tentative End of Block Exam Schedule

Theory Paper	Time 9:00 - 12:00	Examination Hall
Day and Date	**Subjects**	**venue**
Tuesday 21 May 2024	Essential of Medicine - **I**	Dental Exam Hall
Friday 24 May 2024	Essential of Dentistry - **I**	Dental Exam Hall
OSPE & VIVA VOCE (Time 09:00 AM to 03:00 PM)		
DATE	**Essentia of Medicine - I**	Essential of Dentistry - **I**
Monday 27 May 2024	Batch A	Batch B
Tuesday 28 May 2024	Batch B	Batch A
Wednesday 29 May 2024	Computer Skill	Assessment

Tentative Class Test Schedule

DATE	SUBJECT	DAY
15th April-24	Biochemistry	Monday
22th April -24	Anatomy	Monday
29th April -24	Physiology	Monday
6th May-24	Oral Biology	Monday

Assessment Map



1. Anatomy

S No.	Topics/ Theme	Learning Outcomes	Learning Objectives	IC Codes	MIT	Assessment Tools
		By the end of this block, students should be able to:				
M I (foundation)						
General Anatomy						
1.	Introduction to anatomical terms and planes	Comprehend basic terminology and planes of the sections to facilitate further knowledge	**Knowledge** Define different disciplines of Anatomy Identify terms of position in relation to anatomical position: • Anterior /Posterior • Ventral /Dorsal • Superior /Inferior • Caudal / Rostral / Cranial • Medial /Lateral • Proximal /Distal • Palmar /plantar • Superficial/Deep • Supine /Prone Identify the following anatomical planes with the help of diagrams. • Coronal • Sagittal • Horizontal • Parasagittal	IC2 IC 4	• Lectures • SGD	• MCQ • SAQ/SEQ/ OPSE/ Structured viva

			Identify the various techniques to study anatomy in the living such as Plain radiographs **Skill:** Identify type of section on a model Demonstrate normal anatomical position in a SP			
		Appraise the movements occurring at different types of movements occurring at different joints of the body.	Knowledge Identify the terms of movements with general reference to the axis and planes in which they occur • Flexion /Extension • Abduction /Adduction • Lateral rotation / Medial rotation • Pronation /Supination • Plantar flexion / Dorsal flexion • Circumduction • Eversion /Inversion **Skill:** Demonstrate these movements in a subject		• Lectures • SGD	• MCQ •OPSE/ Structured viva

3.	Osteology	Summarize the general features of bones.	**Knowledge** • Identify the axial and appendicular parts of a human skeleton. • Classify bones according to their development and shape giving examples of each type especially from head and neck (wherever possible). • Describe the process of both types of ossification • Describe blood supply of the long &diploic bones	IC 2	• Lectures • SGD	• OPSE/ Structured viva
	Arthrology	Anatomize the general features of joints. Classify joints according to their structure with examples of each type especially from head and neck	**Knowledge** Describe the general structure of a synovial joint Discuss anatomy of joints with reference to dislocation, sprain, and inflammation Describe Hilton's law	IC 1 IC 4 IC 5	• Lectures (LGIS) • SGD	• OPSE/ Structured viva
	Myology	Appraise the general features of muscles	**Knowledge** Classify muscles into three basic types. Correlate skeletal muscles according to their shape, Muscle fiber types and functions with examples of each type.	IC 1 IC 4 IC 5	• Lectures (LGIS) • SGD, SDL	• OPSE/ Structured viva
M II (cell structure & function)						

Embryology						
1.	Gametogenesis	Elaborate the development of germ cell.	**Knowledge** • Revisit cell division, mitosis & meiosis • Describe the events of spermatogenesis • Describe the events of spermiogenesis • Describe the relation of ovarian cycle with maturation of follicles. • Describe the stages of follicular maturation -Primary -Preantral -Secondary -Preovulatory. • Describe the process of ovulation and correlate its timing with ovarian cycle. • Define fertilization • State normal site of fertilization • Describe the results of fertilization • Enlist the factors affecting fertilization • Enumerate the changes that occur in spermatozoa before fertilization • Explain the factors affecting penetration of sperm through the zonapellucida for formation of Pro-nuclei.	IC 2	• Lectures (LGIS) • SGL	• MCQ • SAQ/SEQ/ OPSE/ Structured viva

2.	First week of Development	Appraise the events of first week of development of the embryo.	**Knowledge** • Appraise the implantation and its normal site • Describe the changes in uterus at time of implantation. • Explain the process of cleavage • Explain the formation of morula and blastula • Describe the formation of inner and outer cell mass within the blastocyst cavity • Appraise abnormal sites for implantation (ectopic pregnancy) and its clinical significance.	IC 2 IC 3 IC 4 IC 5		
3.	Second week of development.	Appraise the events of second week of development of the embryo.	**Knowledge** Discuss the formation of bilaminar embryonic disc from embryoblast. • Describe early differentiation of trophoblast• Explain the formation of amniotic cavity • Explain the formation of chorion, secondary yolk sac and chorionic plate. • Explain the establishment of uteroplacental circulation. • Appraise 2nd week as week of twos.	IC 2	• Lectures (LGIS) • SDL	• MCQ • SAQ/SEQ/ OPSE/ Structured viva

4.	Third week of development	Appraise the events of third week of development of the embryo	**<u>Knowledge</u>** • Define gastrulation (formation of three germ layers) • Discuss the development, significance and fate of primitive streak • Describe the development of notochordal process, notochord canal, prechordal plate and cloacal membrane • Compare the topographic arrangement and derivatives of three components of intraembryonic Mesoderm (Paraxial, Intermediate and Lateral Plate Mesoderm) • Describe early development of CVS. • Describe differentiation of trophoblast during third week and formation of primary, secondary and tertiary chorionic villi • Enumerate the parts of placenta • Explain formation and fate of allantois.	IC 2	• Lectures (LGIS) • SDL	• MCQ • SAQ/SEQ/ OPSE/ Structured viva
Histology						

8.	Cell	Appraise the light microscopic structure of the cells	**Knowledge** • Introduction to histology, microscope • Differentiate between acidophilic and basophilia. • Enumerate different cell organelles and identify staining reaction of each. • Illustrate shapes of different cells with example • Enumerate different components of the cytoskeleton. • Correlate the structure of different type of intercellular junctions with their functions. **Skills** • Focus the prepared slide at different magnifications. • Draw the labeled diagram of cells having various shapes. **Attitude** Follow the proper dress code of a medical laboratory Obtain consent before starting the procedure and thank in the end Maintain his/her workstation according to the prescribed SOPs Report any damage to lab equipment immediately	IC 2 IC	• Lectures (LGIS) • SDL, practical demonstration • Practical demonstration • Practical demonstration	• MCQ • SAQ/SEQ/ OPSE/ Structured viva • OPSE/ Structured viva • Formative checklist

9.	Epithelium	Appraise the light microscopic structure of epithelial tissue	**Knowledge** • Define epithelium • Compare surface Epithelium with examples of each type. • Classify glandular epithelium with examples of each type. • Compare the ultrastructure of microvilli, stereocilia and cilia and correlate with their roles in various cellular functions • Classify glands according to their morphology, secretory products and mode of secretion with examples of each type **Skills** • Identify different types of epithelia under light microscope and enlist at least two identification points for each type. • Draw labelled diagrams of each type of epithelium. • Compare and contrast between the histological structure of serous and mucous secreting cells. • Draw labelled diagram of mucous and serous acini. **Attitude** Follow the proper dress code of a medical laboratory	IC 2	• Lectures (LGIS) • SDL, practical demonstration • Practical demonstration	• MCQ • SAQ/SEQ/ Structured viva • OPSE/ Structured viva

			Obtain consent before starting the procedure and thank in the end Maintain his/her workstation according to the prescribed SOPs Report any damage to lab equipment immediately		• Practical demonstration	• Formative checklist
10.	Connective tissue	Compare and contrast various bleeding disorders	**<u>Knowledge</u>** • Define connective tissue and list three basic components of connective tissue. • List different types of cells and fibers in the connective tissue. • Compare various types of connective tissue with example of each type. • Summarize a brief account of histological features of different types of connective tissue. • Draw labelled diagrams showing light microscopic structure of loose connective tissue, dense regular, irregular and adipose connective tissue.	IC 1 IC 2 IC 3 IC 4 IC 5	• Lectures (LGIS) • SDL, flipped classroom,	• MCQ • SAQ/SEQ/ Structured viva

			Skill • Identify the slides of loose connective tissue, dense regular, dense irregular and adipose connective tissue under light microscope and list at least two identification points of each type. • Draw labelled diagrams showing light microscopic structure of loose connective tissue, dense regular, irregular and adipose connective tissue.	IC 4 IC 5	• Practical demonstration	•OSPE/ structured viva

			Attitude • Follow the proper dress code of a medical laboratory • Obtain consent before starting the procedure and thank in the end • Maintain his/her workstation according to the prescribed SOPs	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist
11.	Muscle	Appraise the light microscopic structure of muscle.	**Knowledge** • Differentiate the microscopic features skeletal, smooth and cardiac muscle while correlating with their functions. • Explain the histological differences of different types of muscles.	IC 2	• Lectures (LGIS) • SDL, flipped classroom,	• MCQ • SAQ/SEQ/ Structured viva
			Skill • Identify microscopic sections of different types of muscle under light microscope and list at least two identification points of each type • Draw labelled diagrams showing light microscopic structure of different types of muscles.	IC 4 IC 5	Practical demonstration	OSPE

			Attitude: • Follow the proper dress code of a medical laboratory • Obtain consent before starting the procedure and thank in the end • Maintain his/her workstation according to the prescribed SOPs	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist
12.	Bone	Appraise the light microscopic structure of bone.	**Knowledge** • Compare microscopic structure of compact and cancellous bone. • Correlate the process of bone remodeling with tooth bracing and adjustment.	IC 2	• Lectures (LGIS) • SDL	• MCQ • SAQ/SEQ/ Structured viva
			Skill Identify the slides of cancellous and compact bone under light microscope.	IC 1 IC 3 IC 4 IC 5	•Practical demonstration	•OSPE
			Attitude • Follow the proper dress code of a medical laboratory • Obtain consent before starting the procedure and thank in the end • Maintain his/her workstation according to the prescribed SOPs	IC 1 IC 4 IC 5	•Practical demonstration	•Formative checklist

Physiology

Learning outcomes block 1

S No.	Topics/ Theme	Learning Outcomes	Learning Objectives	IC Codes	MIT	Assessment Tools
		By the end of this block, students should be able to:				
		Cell Physiology				
1.	Introduction	Comprehend the basic concepts of Physiology	Describe the organization of human body (from cell to multicellular organism)	IC2	LGIS	MCQs SAQ/SEQs Structured Viva

2.	Homeostasis	Appraise functional Organization of the Human Body and Control of the "Internal Environment	**Knowledge** • Recognize the interplay of various organ systems in maintaining homeostasis. • Identify the role of feedback mechanisms (positive, negative, feedforward) in maintaining an 'internal milieu.' • Differentiate between the composition of intracellular and extra cellular fluid	IC 2	LGIS /SGD	MCQs SAQ/SEQs Structured Viva
			Skill •Record average body temperature	IC 2 IC 4	Practical Demonstration	OSPE
3.	Cell Physiology	Relate the structure of cell and its various components to metabolic processes, genetic control and locomotion	**Knowledge** • Revisit the structure and function of the cell and its organelles (cell membrane, cytoplasmic organelles, nuclear membrane, nuclear organelles) • Compare modes of transport of substances across the cell membrane • Discuss cell membrane with examples (Osmosis, diffusion, facilitated diffusion, primary active transport, secondary active transport)	IC 2	LGIS	MCQs SAQ/SEQs Structured Viva

			Skill • Identify the parts of the microscope • Practice focusing of slides at different magnification	IC 1 IC 4	Practical Demonstration	OSPE
			Attitude • Follow the proper dress code of a medical laboratory • Demonstrate proper use of microscopes and slides properly according to prescribed SOPs • Report any damage to lab equipment immediately	IC 1 IC 4 IC 5	Practical Demonstration	Formative Checklist
			NERVE AND MUSCLE			
4.	Membrane potentials and action potentials	Differentiate various types and phases of action potentials based on nerve morphology, the concentration of ions in body fluid compartments	**Knowledge** •Appraise basis of development of membrane potential across excitable •Recognize Nernst potential and its importance in the generation of membrane potential • Identify various factors/mechanisms responsible for the genesis of membrane potential(role of channels, carrier proteins, stimuli).	IC 2	LGIS SGD	MCQs SAQ/SEQs Structured Viva

		and clinical significance	• Illustrate different phases of action potential mentioning details of ionic changes occurring during each phase of action potential • Distinguish between types and importance of refractory period • Differentiate between myelinated and non-myelinated nerve fibers based on their structure and characteristics			
5.	Excitation contraction coupling and NMJ	Correlate the physiological mechanism of neuromuscular transmission and excitation-contraction coupling with various neuromuscular diseases	**Knowledge** • Tabulate macroscopic, microscopic, and functional differences of various types of muscles. • Illustrate neuromuscular junction, sequence of events taking place during neuromuscular transmission • Explain the physiological importance of a motor unit • Describe the ionic and chemical basis of muscle contraction • Distinguish between phases of muscle contraction in detail • Relate the pathophysiology of neuromuscular transmission in	IC 2 IC 3 IC 4 IC 5	LGIS SGD CBL Flipped classroom Journal Club	MCQs SAQ/SEQs Structured Viva

			myasthenia gravis			
6.	Excitation and Contraction of Smooth Muscle	Appreciate the characteristics of smooth muscle contraction with their physiological significance	**Knowledge** • Describe the role of Smooth endoplasmic reticulum in smooth muscle contraction	IC 2	LGIS	MCQs SAQ/SEQs Structured Viva
BLOOD						
7.	Hemopoiesis	Describe the morphology	**Knowledge**	IC 2	LGIS CBL	MCQs SAQ/SEQs

		and genesis of blood cells	• Differentiate between various types of blood cells based on their morphological and physiological characteristics. • Overview sites of hemopoiesis in the body during different life stages along with bone marrow composition and functions • Identify the factors regulating erythropoiesis and maturation of red blood cells • Appreciate the composition of blood and general functions of blood • Explain different types of plasma proteins with their functional significance		SGD SDL	Structured Viva
			Skill • Demonstrate Hematocrit estimation	IC 4 IC 5	Practical demonstration	OSPE
			Attitude • Follow the proper dress code of a medical laboratory • Maintain his/her workstation according to the prescribed SOPs • Report any damage to lab	IC 1 IC 4 IC 5	Practical demonstration	Formative checklists

			equipment immediately			
8.	Red Blood Cells Dyscrasias	Differentiate between various types of anemias and their clinical and lab presentation	**Knowledge** • Relate the morphology and physiology of different types of hemoglobin • Compare and contrast different types of anemia based on etiology, pathophysiology, clinical presentations, and blood picture • Describe the etiology, pathophysiology, and clinical presentation of polycythemia	IC 2 IC	LGIS CBL Flip classroom	MCQs SAQ/SEQs Structured Viva
			Skill • Measure red cell indices • Measure Hb estimation using Sahli's apparatus	IC 4 IC 5	Practical demonstration	OSPE

			Attitude • Follow the proper dress code of a medical laboratory • Obtain consent before starting the procedure and thank in the end • Maintain his/her workstation according to the prescribed SOPs • Report any damage to lab equipment immediately	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist
9.	WBCs & Immunity	Classify different types of immunity based on cell types and their role in defence mechanisms	**Knowledge** • Relate the morphology and physiology of different WBCs with clinical presentations of leukopenia, leucocytosis, and leukaemia • Appraise the clinical significance of the reticuloendothelial system (RES) • Describe the pathophysiology of inflammation and necrosis • Describe the physiological basis of vaccination	IC 2	LGIS	MCQs SAQ/SEQs Structured Viva

10.	Hemostasis and Blood Coagulation	Compare and contrast various bleeding disorders	**Knowledge** • Identify the role of cells and proteins involved in maintaining hemostasis • Differentiate between intrinsic and extrinsic regulations of blood coagulation • Discuss the morphology, etiology, pathophysiology and clinical presentation of thrombocytopenia, thrombocytosis and hemophilia	IC 1 IC 2 IC 3 IC 4 IC 5	LGIS SGD Flip Classroom Journal Club	MCQs SAQ/SEQs Structured Viva Presentations
			Skill • Calculate platelet count using Neubauer's chamber	IC 4 IC 5	Practical demonstration	OSPE
			Attitude • Follow the proper dress code of a medical laboratory • Obtain consent before starting the procedure and thank in the end • Maintain his/her workstation according to the prescribed SOPs	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist

11.	Blood grouping and transfusion reactions	Analyze transfusion reactions	**Knowledge** • Explain the principles of blood grouping keeping in view their physiological significance • Identify the various blood groups and hazards of matched and mismatched blood	IC 2	LGIS	MCQs SAQ/SEQs Structured Viva
			Skill • Identify ABO and Rh blood groups	IC 4 IC 5	Practical demonstration	OSPE
			Attitude: • Follow the proper dress code of a medical laboratory • Obtain consent before starting the procedure and thank in the end • Maintain his/her workstation according to the prescribed SOPs	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist
			CVS			
12.	Physiological anatomy of the heart and cardiac action potential	Appreciate the functional characteristics of cardiac muscle, action potential and cardiac impulse	**Knowledge** • Appreciate the physiological arrangement of right and left hearts and the parallel arrangement of the systemic circulation	IC 2	LGIS SDL	MCQs SAQ/SEQs Structured Viva

			• Recognize physiological anatomy of cardiac muscles, its functional syncytium and intercalated disc • Differentiate between cardiac, skeletal, and smooth muscles based on macro-, microscopic, functional differences, and action potentials • Distinguish ionic changes in different phases of an action potential within cardiac muscle • Correlate the phases with ionic changes during pacemaker action potential in the heart • Comprehend the cardiac impulse transmission			
			Skill • Examine the radial pulse	IC 1 IC 3 IC 4 IC 5	Practical demonstration	OSPE
			Attitude • Follow the proper dress code of a medical laboratory • Obtain consent before starting the procedure and thank in the end	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist

			• Maintain his/her workstation according to the prescribed SOPs			
13.	Cardiac Cycle	Compare and contrast the pressure and volume changes in different components of the circulatory system during the cardiac cycle	**Knowledge** • Illustrate pressure and volume changes during various phases of the cardiac cycle • Illustrate a pressure-volume diagram of the left heart • Comprehend preload and afterload, and its influence on stroke volume (The Frank Starling's mechanism) • Discuss the autonomic regulation of the heart	IC 2	LGIS SDL SGD	MCQs SAQ/SEQs Structured Viva
			Skill • Record Blood Pressure using palpatory and auscultatory method • Illustrate the effects of posture and exercise on Blood Pressure	IC 1 IC 4 IC 5	Practical demonstration	OSPE
			Attitude • Follow the proper dress code of a medical laboratory • Obtain consent before starting the procedure and thank them in the end	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist

			• Maintain his/her workstation according to the prescribed SOPs • Report any damage to lab equipment immediately			
14.	Control of Local Blood	Identify the dynamics of local and peripheral Blood flow	**Knowledge** • Distinguish between acute and chronic control of local blood flow • Conceptualize active and reactive hyperemia • Relate the blood flow control in relation to total peripheral resistance	IC 2	LGIS	MCQs SAQ/SEQs Structured Viva
			Skill • Measure bleeding time and clotting time on the given sample • Calculate Differential Leaukocyte Count (DLC) using Neubauer's chamber	IC 4 IC 5	Practical demonstration	OSPE

			<u>Attitude</u> • Follow the proper dress code of a medical laboratory • Obtain consent before starting the procedure and thank them in the end • Maintain his/her workstation according to the prescribed SOPs • Report any damage to lab equipment immediately	IC 1 IC 4 IC 5	Practical demonstration	Formative checklist

Biochemistry

BIOCHEMISTRY					
MODULE –I ; FOUNDATION MODULE **DURATION ; 02 WEEKS**					
Topic/ Theme	**Learning outcomes**	**Learning Objectives/Contents**	**Instructional strategies**	**Code of IO**	**Assessment tool**
Introduction to Biochemistry	Comprehend the basic concepts of biochemistry	**Knowledge:** What is biochemistry ? • Scope of Biochemistry • Importance of Biochemistry	LGIS SGD	IO-1	MCQ SAQ/SEQ Structured viva
MODULE –II ; CELL STRUCTURE AND FUNCTION **DURATION ; 03**					
Cell structure and function	Cell cytology	**Knowledge:** Cytological techniques - Centrifugation - Ultracentrifugation Differential Centrifugation	LGIS SGD	IO-1	MCQ SAQ/SEQ Structured VIVA
	Understand the biochemical aspects of a **cell membrane**	**Knowledge:** • Overview of biochemical composition of a cell membrane • Describe the biochemical significance of different types of membranes - RBCs	LGIS SGD	IO-1 IO-2 IO-7	MCQ SAQ/SEQ Structured viva

			- Mitochondria, Nucleus, ER, Golgi apparatus etc			
		Understand Cell Organelles, biochemical aspects of **cell organelles** along with their associated Disorders-	Overview of various Cell Organelles with their biochemical composition, functions and associateddisorders - Nucleus (Replication & Transcription) - Ribosomes (Translation) Peroxisomes (FA metabolism, antioxidant functions, signaling) - Mitochondria (ETC, TCA, β oxidation of FA, Heme biosynthesis, Urea cycle etc) - Golgi Apparatus (post translational modification, Metabolism of FA) - Endoplasmic Reticulum (FA synthesis, transport of various secretoryvesicles) - Lysosomes (degradation of glycogen and fat)	LGIS SGD	IO-1 IO-2	MCQ SAQ/SEQ Structured viva
		Relate the concept of	**Knowledge:** Describe the chemistry of cell surface and intracellular	LGIS SGD	• IO-2	MCQ SAQ/SEQ Structured VIVA

		biochemical processes in relation to signal transduction in health and disease	receptors and related signaling mechanism • Elaborate the role of signal transduction in health and disease - Cholera - Pertussis			
		Relate the concept of specialized cellular transport mechanisms	**Knowledge:** • Overview various membrane transport mechanisms - GLUTs - SGLT - Carnitine shuttle - H/K ATPase pump - Cl ion channels (Cystic fibrosis) - Malate shuttle - Receptormediated endocytosis - Glyceraldehyde 3phosphate shuttle - Aquaporins • ATP sensitive K Channel	LGIS SGD	IO-2	MCQ SAQ/SEQ Structured viva
	Genetics	Apply the knowledge of genetics and molecular biology in	**Knowledge:** • Overview of replication, transcription & translation (not the steps) • Mutations	LGIS SGD	IO-2	MCQ SEQ/SAQ Structured viva

		treatment of diseases	• Role of genetics in cancer development • Molecular Biology technique-PCR • Molecular Biology and role intreatment of diseases (cloning,gene therapy)			

Practicals:

- **SKILLS**

Blood sample collection and storage
Safety in laboratories
Introduction to use of glassware
Introduction to use of Laboratory Equipment-I
- Micro lab
- Incubator
- Water Bath

Introduction to use of Laboratory Equipment-II
- Hot Air Oven
- Centrifuge Machine
- Electric Balance
- pH Meter

Handling the equipments and instruments	To practice safety during lab work (All Modules)	**Affective domain** • Follow proper dress code of a laboratory • Handle chemicals and lab equipment properly	

		according to SOPs displayed in lab • Report any damage to lab equipment immediately • Obtain consent before starting the procedure and thank them in the end	
Cleanliness of work station	To arrange the required apparatus and chemicals safely (All Modules)	Maintain work station according to SOPs	

MODULE-III ; HAEMATOLOGY AND IMMUNOLOGY
DURATION ; 03 WEEKS

Enzymes	Apply the basic concepts of enzymes	• Introduction , Definition , Classification • Mechanism of catalysis • Coenzymes, Co-factors, and their biochemical role in human body • Km ,Vmax- concept of Enzyme kinetics and biomedical importance • Factors affecting enzymes activity	• LGIS • SGD	• IO-1IO- • IO-2 • IO-5	• MCQ • SAQ/SEQ Structured viva

		in the human body • Michaelis-Menten equation & and its biomedical importance (no derivation of equations) • Enzyme inhibitions and their classification and biomedical importance • Regulation of enzyme activity-overview • Overview of Vitamins as • coenzymes (B1, B2, B3, B6, • biotin, pantothenic)			
Hemoglobin	Correlate the biochemical basis of Hemoglobin with clinical conditions	**Knowledge:** • Chemistry and biosynthesis of haemoglobin • Structure, functions and types of hemoglobin • Oxygen binding capacity of hemoglobin, factors affecting and regulating the oxygen binding capacity of hemoglobin • Degradation of heme, formation of Bile pigments, its types, transport and excretion • Hyperbilirubinemia , their biochemical causes and differentiation • Jaundice and its types • Hemoglobinopathies (HP-S,	LGIS SGD CBL PBL	IO-1 IO-2	• MCQ • SEQ/SAQ • Structured viva

		Thalassemia) and their biochemical causes			
Biochemical basis of Anemia	To understand the biochemical aspects of enzyme and vitamin deficiency in anemia and bleeding disorders	**Knowledge:** • Hemolytic anemia 1. G6PD- with reference to HMP shunt and NADPH uses 2. PK deficiency with reference to the clinical significance of glycolysis • Role of Vit B9 & B12 in Nutritional Anemia • Role of Fe in Nutritional Anemia • Role of Vitamin C & K inbleeding disorders	LGIS SGD PBL CBL	IO-2 IO-3	MCQ SAQ/SEQ
Plasma proteins and Immunoglobuli Ns	Relate the basic knowledge of Plasma proteins to its clinical significance	**Knowledge:** Describe Plasma proteins & give their clinicalsignificance- • Draw and label the Structure ofImmunoglobulins • Enumerate major types, functions & Properties of Immunoglobulins	LGIS SGD CBL PBL	IO-1 IO-2	MCQ SEQ/SAQ Structured viva
Practicals:					

• Estimation of serum amylase with micro lab					
MODULE IV ; CARDIOVASCULAR SYSTEM DURATION ; 05 WEEKS					
Lipid chemistry and metabolism	Relate the significance of different lipids in medicine	**<u>Knowledge:</u>** • Definition , biomedical functions , classification of lipids • Glycolipids, Sphingolipidsand their biochemical significance • Fatty acids chemistry , classification and biochemical functions Essential fatty acids • Mobilization and transportation of fatty acids • Beta oxidation overview • Steroids, sterol e.g. cholesterol, their chemistry, functions and clinical significance • Overview of ketogenesis and ketolysis • Mechanism of utilization of Ketone bodies and significance	LGIS SGD	IO-7	MCQ SEQ/SAQ Structured viva

		• Overview of cholesterol synthesis and Lipoprotein metabolism and clinical significance • To understand role of Obesity in CVDs • Define and explain Hypercholesterolemia in relation with thepathophysiology of atherosclerosis, Mediterranean diet			

Clinical Enzymology	Elaborate the biochemical importance of isoenzymes as well as their role in various clinical conditions	**Knowledge:** Isoenzymes ● Application of enzymes in clinical diagnostics and therapeutics ● Describe the role of Troponins in Diagnosis of MI	LGIS SGD	IO-7	MCQ SEQ/SAQ Structured viva
Practicals: Lipid profile by microlab					

Oral biology

Topic / Theme	Learning Outcomes	Learning Objectives	Integrated Learning	IC Codes	MITs	Assessment Tools

			objectives with other subjects			
Introduction to orofacial structures	Discuss the orofacial structures	**<u>Knowledge:</u>** • Identify the names and location of skeletal, dental and soft tissues of orofacial region.		IC 2	LGIS	MCQs SEQs
Introduction and nomenclature	Classify dentition	**<u>Knowledge:</u>** • Describe the proper definition, and select the correct definition or description from a list, for any structure presented in the sections covering general anatomy and anatomical structures. • Demonstrate knowledge of dental formulae by supplying, or selecting from a list, the correct information regarding a given dental formula. • Indicate the normal eruption sequence, or order, for deciduous and permanent teeth, by listing, or selecting from a list, the proper sequences. • Define and correctly identify from a list, the three periods of human dentition, as well as identify the approximate time intervals of their existence, and normal initiation and termination events.	**Pre-clinical Operatives** Discuss the nomenclature and various terminologies used for tooth preparation **Orthodontics** Age estimation on the basis of dentition	IC 2	LGIS SGD	MCQs SEQs Structured VIVA

		• Define the term "succedaneous", and be able to select from a list the tooth or teeth which are succedaneous. • Identify and select from a list, the proper name for tooth surfaces, or thirds of tooth surfaces, when given a diagram or description. • Demonstrate knowledge of the various dental numbering systems by the correct symbol for a given name or description. **SKILL:** • Identify either deciduous or permanent teeth by their proper name, when given a diagram or description of their function, arch position, or alternative name. • Identify the type and number of deciduous or permanent teeth per quadrant, arch, and in total. • Identify the type and number of teeth which are anterior or posterior			

General Embryology	Relate the knowledge of human development to its clinical significance	**Knowledge:** • Define fertilization,zygote, embryo, germ layer, notochord, • morula, blastocyst, trophoblast, neuralcrest cells • Describe germ layer formation and fate • Describe neural crest cells in termsof formation, migration, • Role in orofacial development andassociated anomalies (Treacher Collins syndrome) • Discuss etiological factors responsible for congenital defects effecting facial development • Enumerate derivatives of ectoderm, edoderm, mesoderm,neural crest cells, pharyngeal arches, pouches and clefts • Describe the development of face in terms of processes involved and their role in formation of lips, nose, forehead, cheeks and jaws **SKILLS** • Identify in pictures/images		IC 2 IC 1 IC 4	Lectures SGD Demonstrati on	MCQs SEQs VIVA OSPE

		developmental anomalies associated with incomplete fusion of facial processes (unilateral, bilateral and median cleft lip, oblique facial cleft, median cleft/frontonasal dysplasia, lateral facial cleft, mandibular cleft)				

Development of mandible, Maxilla, palate & tongue	Relate the knowledge of orofacial development to ts clinical significance	**<u>Knowledge</u>** • Describe and identify development of primary and secondary palate interms of time frame,processes involved,fusion of shelves and associated anomalies (cleft palate and its types) • Describe the development of tongue • Describe development of thyroid gland • Describe the developmental of mandible in terms of growth cartilages (names, period of activity, role and fate of primary and secondary growth cartilages), ossification centers, spread of ossification, post-natal growth • Describe the formation of different components of mandible; condyle,	**Orthodontics** Describe briefly the normal growth and development of the craniofacial complex. **Oral Pathology** List the causes of dentofacial deformities. **Orthodontics** Explain briefly the different theories of growth. **OMFS** Classify cleft lip and palate List the OMF problems faced by a cleft patient.	IC 2	Lectures SGD	MCQs Viva

		ramus, coronoid process and body of mandible • Describe the prenatal growth of maxilla in terms of time frame, processes involved, location of ossification center, spread of ossification, name, location, role and fate of growth cartilages • Describe postnatal growth of maxilla in terms of theories associated with growth (functional matrix, cartilage growth, sutural growth), bone remodeling and its impact on growth and position of maxilla **SKILLS** • Draw and label and identify in images/models both developing and mature mandible bone		IC 1 IC 4 IC 5	Demonstration	OSPE

Tooth development	Discuss development of teeth	**<u>Knowledge</u>** • Describe sequence of developmental changes occurring in maxillary and mandibular processes in areas of future dental arches during 6th & 7th weeks of intra uterine life • Describe the stages of tooth development • Differentiate between dental lamina and vestibular Lamina and Dental • Define enamel knot, Rough endoplasmic reticulum, Enamel cord, Enamel niche. • Describe clinical relevance of different histological structures in tooth development • Discuss structural variations of oral mucosa • Discuss arterial supply of oral mucosa • Explain components/parts of dental lamina on basis of	**Oral Pathology** Discuss the developmental abnormalities associated with teeth	IC 2	Lectures,	MCQs,SEQs, Viva

		developmental timings & their attachment to primary, permanent and non- succedenous tooth buds • Identify components of dental lamina in histological pictures/slides (lateral lamina, successional lamina) • Discuss importance • and process of angiogenesis in relation with the developing tooth germ with reference to location and timings • Discuss relation of developing nerve fibers with early tooth germ with reference to location and timings • Explain inductive • influences of inner enamel epithelial cells of enamel organ and peripheral cells of dental papilla on each other • Describe histodifferentiation, function and movement		IC 1 IC 4 IC 5	Demonstrations.	OSPE

		of enamel and dentin forming cells (ameloblasts and odontoblasts) in relation to each other • Explain source of nourishment for ameloblasts and odontoblasts during • hard tissue formation **Skill** • Draw and label dental and vestibular lamina • Draw and label histology of cap and bud stage • Draw and label bell stage • Identify on a histological picture/slide the following structures: Oral Epithelium, Mesenchyme, Dental lamina, vestibular lamina, tooth bud				

		• Identify label enamel organ, dental papilla and dental follicle along with stages of tooth development in histological pictures (bud, early and late cap stage, early and late bell stage) with the help of microscope • Identify draw and label HERS, Rest cells of Malassez and root formation in histological pictures • Draw and label HERS, Rest cells of Malassez and root formation in histological pictures				
Enamel	Explain the histological features of enamel	**<u>Knowledge</u>** • Discuss the developmental and histomorphological stages of ameloblasts during amelogenesis • Discuss the developmental and histomorphological	**Oral Pathology** Amelogenesis imperfecta	IC 2	LGIS SGD Presentations	MCQs SEQs VIVA

		stages of ameloblasts during amelogenesis • Classify enamel proteins according to their function during amelogenesis **Skills** • Draw and label stages of amelogenesis		IC 1 IC 4 IC 5	Demonstration	OSPE
	Discuss the characteristics of enamel	**Knowledge** • Describe the physical characteristics of enamel		IC 2	SGD on models	MCQs SEQs VIVA OSPE
Enamel	Discuss the properties of enamel	**Knowledge** • Discuss Enamel composition and structure of enamel rod • Discuss the mineralization pathway of enamel • Discuss age-Discussd changes in enamel. • Draw labelled diagram of dentinoenamel junction (DEJ), spindle, tufts, and Enamel Lamellae in pictures/ images	**Operative Dentistry** Orientation of enamel rods during cavity prep Cavo-surface angle	IC 2	LGIS SGD CBL	MCQs SEQs VIVA

		<u>Attitude</u> Maintain good collaborative learning environment		IC 2 IC 4	SGD	Formative assessment
	Explain the histomorphological features with clinical implications	**<u>Knowledge</u>** • Discuss morphological, histological, environmental, and functional changes which occur in enamel due to ageing • Discuss the clinical implications of enamel ageing process		IC 2	LGIS SGD /CBL LGIS	MCQs SEQs VIVA MCQs SEQs VIVA
Dentin	Discuss formation of dentin. Correlate different types of dentin Apply developmental and histomorphological knowledge of dentin to different clinical scenarios	**Knowledge** : • Describe Globular and Linear • mineralisation in terms of matrix vesicle formation and fusion • Describe the structure of dentinal tubules and composition of dentine • Differentiate between different types of dentine	**Pre-clinical Operative** Discuss the defensive and reparative mechanisms of dentin-pulp complex. (VILP) **Operative Dentistry**	IC 2	LGIS Demonstrations	

		Differentiate between different types of dentine • Describe composition by weight and volume, physical properties, innervation, vascularity, permeability, functions and age changes of dentin • Describe formation, • location, structure, thickness and function of predentin, primary, secondary and tertiary dentin. Also draw and label • Discuss process of dentinogenesis in terms of odontoblasts formation and differentiation, role of Hertwig's epithelial root sheath, organic matrix deposition and mineralization • Describe Globular and Linear Mineralization in terms of matrix vesicle formation and fusion **<u>Skills</u>** •Identify in histological slides/pictures pre dentin, primary dentin, secondary dentin, tertiary dentin, dentinal	Define the basic concept of adhesion to enamel and dentin **Science of dental materials** Describe the concept of bonding and adhesion in dentistry. Compare the development of smear layer and hybrid layer with reference to the acid etch technique. **Operative Dentistry** Enumerate the basic concepts of adhesion to enamel and dentin	IC 1 IC 4 IC 5	Practical demonstration	MCQs SEQs VIVA OSPE

		tubule, intertubular dentin, peritubular dentin, interglobular dentin, Incremental lines, granular layer of tomes, sclerotic dentin, dead tracts. •Draw and label stages of dentinogenesis	**Pre-clinical Operatives** Discuss the basic concept of adhesion to enamel, dentin, and cementum **Operative Dentistry** Discuss the abnormalities associated with tooth structure i.e., enamel, dentin, and cementum defects			
Pulp	Discuss dentine pulp complex	**Knowledge** • Discuss age changes /dentine sensitivity • Discuss the growth line of dentine • Describe the names, location, scontent, and function of four histological zones seen in dental pulp under the microscope. Enlist		IC 2	LGIS Demonstrations/SGD	MCQs SEQs VIVA

		constituents of dental pulp in terms of cells and extracellular substances • Discuss origin, type, size, orientation, and location of collagen fibers in dental pulp • Identify, draw and label functional odontoblastic cell at higher magnification • Describe location, shape, number, arrangement, function and histological features of odontoblastic cells in a functional tooth • Differentiate active and resting odontoblastic cell in terms of histological features and functionality • Describe histological features, shape, location and functions of cells present in pulp (fibroblasts, undifferentiated mesenchymal cells, macrophages,			Lab Demonstration	

		• dendritic cells, lymphocytes) • Describe the orientation, histology, size, type and functions of blood vessels and nerves (myelinated, unmyelinated) in dental pulp • Discuss age related changes seen in dental pulp in terms of volume, content, vascularity, innervation, pathology • Describe types, formation, location, arrangement, appearance and clinical significance of pulp stones **Skills** • Identify functional odontoblastic cells at higher magnification • Identify pulp stones in pictures/images				OSPE

Week-1			
1.	Departmental Introduction	All department faculty and staff	LGIS
2.	Introduction to Cell Physiology	Dr. Ayesha Zafar	LGIS
3.	Homeostasis	Dr. Ayesha Zafar	LGIS
4.	Cell membrane (Integrated session with Biochemistry)	Dr. Ambreen and Dr. Ayesha Zafar	LGIS
5.	Cell organelles-1(Integrated session with Biochemistry)	DrAmbreen and Dr. Ayesha Zafar	LGIS
6.	Cell organelles-2(Integrated session with Biochemistry)	Dr.Ambreen and Dr. Ayesha Zafar	LGIS
7.	Locomotion of cell + Cytoskeleton (Integrated session with anatomy)	Dr.Ayesha/Dr.Aleena/Dr.Fatima	LGIS
Week-2			
8.	Cell Transport-1(Integrated session with Biochemistry)	Dr. Ayesha Zafar and Dr.Ambreen	LGIS
9.	Cell Transport-2(Integrated session with Biochemistry)	Dr. Ayesha Zafar and Dr.Ambreen	LGIS
10.	Resting membrane potential -1	Dr. Ayesha Zafar	LGIS
11.	Resting membrane potential -2	Dr. Ayesha Zafar	LGIS
12.	Action potential -1	Dr. Ayesha Zafar	LGIS
13.	Action potential-2	Dr. Ayesha Zafar	LGIS
14.	Resting membrane potential	Dr.Ayesha/ Dr.Aleena/Dr.Fatima	CBL
Week-3			
15.	Physiological anatomy of skeletal muscles	Dr. Ayesha Zafar	LGIS
16.	Mechanism of Skeletal muscle contraction	Dr. Ayesha Zafar	LGIS
17.	Properties of muscle fiber	Dr. Ayesha Zafar	LGIS

18.	Types of Muscle Fibers	Dr.Aleena	LGIS
19.	NMJ-1	Dr. Ayesha Zafar	LGIS
20.	Impulse Transmission	Dr. Ayesha Zafar	LGIS
21.	Myasthenia Gravis	Dr.Ayesha/ Dr.Aleena/Dr.Fatima	CBL
Week -4			
22.	Smooth muscle	Dr. Ayesha Zafar	LGIS
23.	Mechanism of Smooth muscle contraction	Dr. Ayesha Zafar	LGIS
24.	Differences between Skeletal and Smooth muscle contraction	Dr. Ayesha Zafar/Dr.Aleena/Dr.Fatima	SGD
25.	Composition Functions of Blood	Dr. Ayesha Zafar	LGIS
26.	Functions of Plasma protein (Integrated session with Biochemistry)	Dr.Rabia andDr. Ayesha Zafar	LGIS
27.	Hematopoiesis	Dr. Ayesha Zafar	LGIS
28.	Erythropoesis and its regulation	Dr. Ayesha Zafar	LGIS
Week -5			
29.	Hb synthesis and Iron metabolism (Integrated session with Biochemistry)	Dr.Rabiaand Dr. Ayesha Zafar	LGIS
30.	Anemia-1Iron deficiency and Megaloblastic anemia(Integrated session with Biochemistry)	Dr. Ayesha Zafar and Dr.Rabia	LGIS
31.	Anemia -2	Dr.Ayesha	LGIS
32.	Polycythemias plus dyscrasias	Dr.Fatima	LGIS
33.	Anemia -3	Dr. Ayesha ZafarDr.Aleena/Dr.Fatima	CBL
34.	Granulopoeisis	Dr. Ayesha Zafar	LGIS
35.	Monocyte-Macrophage system	Dr. Aleena	LGIS
Week-6			
36.	Inflammation and Necrosis	Dr. Ayesha Zafar	LGIS

37.	Immunity -1	Dr. Ayesha Zafar	LGIS
38.	Immunity -2	Dr. Ayesha Zafar	LGIS
39.	Immunity -3	Dr. Ayesha Zafar	LGIS
40.	Eosinophills, basophils, Leukemia, leokopenia	Dr.Ayesha/Dr.Aleena/Dr.Fatima	SGD
41.	Hemostasis-1	Dr. Ayesha Zafar	LGIS
42.	Hemostasis-2	Dr. Ayesha Zafar	LGIS
Week-7			
43.	Coagulation pathway -1	Dr. Ayesha Zafar	LGIS
44.	Coagulation pathway-2	Dr. Ayesha Zafar	LGIS
45.	Hemophilia	Dr.Ayesha/Dr.Aleena/Dr.Fatima	Flip Classroom
46.	Blood groups	Dr. Ayesha Zafar	LGIS
47.	Transfusion reactions	Dr.Fatima	SGD
48.	ErythroblastosisFetalis	Dr.Maryam/Dr.Ayesha	CBL
49.	Introduction to the CVS	Dr.Aleena	LGIS
Week-8			
50.	Cardiac muscle as a Functional Syncytium	Dr. Ayesha Zafar	LGIS
51.	Differences between Cardiac, Skeletal, and Smooth muscles	Dr.Ayesha /Dr.Aleena/Dr.Fatima	SGD
52.	Action Potentials in Cardiac muscles	Dr. Ayesha Zafar	LGIS
53.	Cardiac cycle-1	Dr. Ayesha Zafar	LGIS
54.	Cardiac cycle-2	Dr. Ayesha Zafar	LGIS
55.	Cardiac cycle-3	Dr. Ayesha Zafar	LGIS
56.	Cardiac Cycle	Dr.Ayesha /Dr.Aleena/Dr.Fatima	CBL
Week-9			
57.	Autonomic regulation of Heart pumping	Dr. Ayesha Zafar	LGIS
58.	Impulse Transmission in Cardiac muscles	Dr. Ayesha Zafar	LGIS

59.	Introduction to ECG	Dr. Ayesha Zafar	LGIS
60.	Components of ECG	Dr. Ayesha Zafar	LGIS
61.	Interpretation of ECG	Dr. Ayesha Zafar	LGIS
62.	Impulse transmissiom	Dr.Ayesha /Dr.Aleena/Dr.Fatima	SGD
63.	Acute and Chronic control of blood flow and its regulation-1	Dr. Ayesha Zafar	LGIS
64.	Acute and Chronic control of blood flow and its regulation-2	Dr. Ayesha Zafar	LGIS
Week-10			
65.	Short term regulation of Blood pressure -1	Dr. Ayesha Zafar	LGIS
66.	Short term regulation of Blood pressure -2	Dr. Ayesha Zafar	LGIS
67.	Regulation of Blood flow	Dr.Ayesha/Dr.Aleena/Dr.Fatima	SGD
68.	Long term regulation of Blood pressure -1	Dr. Ayesha Zafar	LGIS
69.	Long term regulation of Blood pressure -2	Dr. Ayesha Zafar	LGIS
70.	Control of Blood pressure	Dr.Maryam/Dr.Ayesha	CBL
71.	Determinants of Arterial Blood pressure	Dr. Ayesha Zafar	LGIS
72.	Cardiac Output -1	Dr. Ayesha Zafar	LGIS
73.	Cardiac Output-2	Dr. Ayesha Zafar	LGIS
Week-11			
74.	Venous Return -1	Dr. Ayesha Zafar	LGIS
75.	Venous Return -2	Dr. Ayesha Zafar	LGIS
76.	Cardiac Output During Exercise	Dr. Ayesha Zafar	LGIS
77.	Coronary Circulation (Integrated session with anatomy)	Dr. Ayesha Zafar and Dr.AyeshaYasir	LGIS
78.	Circulatory Shock	Dr. Ayesha Zafar	LGIS
79.	Types of Circulatory Shock	Dr. Ayesha Zafar	LGIS
80.	Septic/hypovolemic Shock	Dr.Ayesha/Dr.Aleena/Dr.Fatima	Flip Classroom

BLOCK I-PRACTICALS

Week.	Practicals	Instructor
1.	Record normal body temperature	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
2.	Study of Microscope	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
3.	Hematocrit estimation and Determine Red cell indices	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
4.	Hemoglobin estimation using Sahli's method	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
5.	Determination of Platelet count	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
6.	Determine ABO and Rh blood groups	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
7.	Bleeding and Clotting time	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
8.	Determine DLC	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
9.	Revision	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
10.	Revision	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib
11.	Revision	Dr.Fatima/Dr.Aleena/ Mr. Islam and Sohaib

Anatomy

Block 1

Sr. No	Topics	Sub-Discipline	MITs	Instructor
		WEEK-1		
1.	Terms of plane, position and movement (subject/models)	General anatomy	Practical	Dr. Marrium, Dr. Amna
2.	Terms of plane and position -I	General anatomy	LGIS	Dr. Ayesha Shahid
3.	Terms of plane and position -II	General anatomy	SGD	Dr. Marrium, Dr. Amna
4.	Microscopic structure of the cell	Histology	LGIS	Dr. Ayesha Shahid
5.	Osteology I	General anatomy	SGD	Dr. Marrium, Dr. Amna
6.	Cytoskeleton (integrated session with physiology)	Histology	LGIS	Dr. Ayesha Shahid, Dr. Ayesha Zafar
7.	Cytoskeleton II	Histology	LGIS	Dr. Ayesha Shahid , Dr. Ayesha Zafar
		WEEK-2		
1.	Introduction to Microscope/Cell shapes	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Osteology II	General anatomy	SGD	Dr. Marrium, Dr. Amna
3.	Gametogenesis-I	Embryology	LGIS	Dr. Ayesha Shahid
4.	Gametogenesis-II	Embryology	LGIS	Dr. Ayesha Shahid
5.	Cell junctions	Histology	LGIS	Dr. Ayesha Shahid
6.	Epithelium I	Histology	LGIS	Dr. Ayesha Shahid

7.	Arthrology	General anatomy	SGD	Dr. Marrium, Dr. Amna
		WEEK-3		
1.	Simple Epithelium	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Epithelium II	Histology	LGIS	Dr. Ayesha Shahid
3.	Epithelium III	Histology	LGIS	Dr. Ayesha Shahid
4.	Myology (integrated session with physiology)	Histology	LGIS	Dr. Ayesha Shahid, Dr. Ayesha Zafar
5.	Myology	General anatomy	LGIS	Dr. Ayesha Shahid
6.	Vasculature of upper limb I	Gross anatomy	SGD	Dr. Marrium, Dr. Amna
7.	Vasculature of upper limb II	Gross anatomy	SGD	Dr. Marrium, Dr. Amna
		WEEK-4		
1.	Stratified epithelium	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Connective tissue-I	Histology	LGIS	Dr. Ayesha Shahid
3.	Gametogenesis-III	Embryology	LGIS	Dr. Ayesha Shahid
4.	First week of development I	Embryology	LGIS	Dr. Ayesha Shahid
5.	Nerves of Upper limb and formation of Brachial plexus	Gross anatomy	LGIS	Dr. Ayesha Shahid
6.	Vasculature of lower limb /Clinical significance I	Gross anatomy	SGD	Dr. Marrium, Dr. Amna

7.	Vasculature of lower limb /Clinical significance II	Gross anatomy	SGD	Dr. Marrium, Dr. Amna
		WEEK-5		
1.	Muscles	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Connective tissue-II	Histology	LGIS	Dr. Ayesha Shahid
3.	First week of development - II	Embryology	LGIS	Dr. Ayesha Shahid
4.	Second week of development -I	Embryology	LGIS	Dr. Ayesha Shahid
5.	Second week of development -II	Embryology	LGIS	Dr. Ayesha Shahid
6.	Second week of development -III	Embryology	LGIS	Dr. Ayesha Shahid
7.	Introduction to lymphatic system	Histology	LGIS	Dr. Ayesha Shahid
		WEEK-6		
1.	Connective tissue	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Third week of development -I	Embryology	LGIS	Dr. Ayesha Shahid
3.	Third week of development -II	Embryology	LGIS	Dr. Ayesha Shahid
4.	Thymus I (integrated session with physiology)	Histology	LGIS	Dr. Ayesha Shahid, Dr. Ayesha Zafar
5.	Thymus II (integrated session with physiology)	Histology	LGIS	Dr. Ayesha Shahid, Dr. Ayesha Zafar
6.	Neurovasculature of the Lower Limb	Gross anatomy	SGD	Dr. Marrium, Dr. Amna

7.	Gross anatomy of the Heart	Gross anatomy	SGD	Dr. Marrium, Dr. Amna
		WEEK-7		
1.	Thymus	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Third week of development -III	Embryology	LGIS	Dr. Ayesha Shahid
3.	Spleen I (integrated session with physiology)	Histology	LGIS	Dr. Ayesha Shahid, Dr. Ayesha Zafar
4.	Spleen II (integrated session with physiology)	Histology	LGIS	Dr. Ayesha Shahid, Dr. Ayesha Zafar
5.	Tonsil I	Histology	LGIS	Dr. Ayesha Shahid
6.	Tonsil II	Histology	LGIS	Dr. Ayesha Shahid
7.	Thymoma	Histology	CBL	Dr. Ayesha Shahid, Dr. Marrium, Dr. Amna
		WEEK-8		
1.	Spleen	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Embryonic period -I	Embryology	LGIS	Dr. Ayesha Shahid
3.	Embryonic period -II	Embryology	LGIS	Dr. Ayesha Shahid
4.	Embryonic period -III	Embryology	LGIS	Dr. Ayesha Shahid
5.	Lymph node I	Histology	LGIS	Dr. Ayesha Shahid

6.	Gross anatomy of heart II	Gross Anatomy	SGD	Dr. Marrium, Dr. Amna
7.	Varicose veins	Gross Anatomy	CBL	Dr. Ayesha Shahid, Dr. Marrium, Dr. Amna
		WEEK-9		
1.	Tonsil	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Embryonic period -IV	Embryology	LGIS	Dr. Ayesha Shahid
3.	Lymph node II	Histology	LGIS	Dr. Ayesha Shahid
4.	Coronary circulation I	General anatomy	SGD	Dr. Marrium, Dr. Amna
5.	Coronary circulation II	General anatomy	SGD	Dr. Marrium, Dr. Amna
6.	Coronary circulation III	General anatomy	SGD	Dr. Marrium, Dr. Amna
7.	Chest pain	Gross anatomy	PBL	Dr. Ayesha Shahid, Dr. Marrium, Dr. Amna
		WEEK-10		
1.	Lymph node	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Bone I	Histology	LGIS	Dr. Ayesha Shahid
3.	Bone II	Histology	LGIS	Dr. Ayesha Shahid
4.	Cartilage	Histology	LGIS	Dr. Ayesha Shahid
5.	Vasculature of the Heart I	Gross anatomy	SGD	Dr. Marrium, Dr. Amna

6.	Vasculature of the Heart II	Gross anatomy	SGD	Dr. Marrium, Dr. Amna
7.	Models of the heart	Gross anatomy	SGD	Dr. Marrium, Dr. Amna
		WEEK-11		
1.	Bone/Cartilage	Histology	Practical	Dr. Marrium, Dr. Amna
2.	Placenta	Embryology	LGIS	Dr. Ayesha Shahid
3.	Revision	Embryology	SGD	Dr. Marrium, Dr. Amn
4.	Revision	Gross anatomy	SGD	Dr. Marrium, Dr. Amna
5.	Revision	Gross anatomy	SGD	Dr. Marrium, Dr. Amna
6.	Revision	Gross anatomy	LGIS	Dr. Ayesha Shahid
7.	Revision	Histology	LGIS	Dr. Ayesha Shahid

Biochemistry

Block 1

Week 01			
Sr.no	**Topic**	**MIT**	**Name of Instructor**
1.	Introduction to Biochemistry	LGIS	Dr.AmbreenGul
2.	Cell organelles	LGIS Integrated session Biochemistry and Physiology	Dr.Rabia and Dr.Ayesha Zafar
3.	Cell membrane-I	LGIS Integrated session Biochemistry and Physiology	Dr. Rabia and Dr.Ayesha Zafar
4.	Cell membrane-II	LGIS	Dr. Rabia
5.	Safety in laboratories	Practical	Dr. NailaZikria
Week 02			
6.	Signal transduction	LGIS	Dr.AmbreenGul
7.	Membrane transport mechanisms	Integrated session Biochemistry and Physiology	Dr.AmbreenGul and Dr.Ayesha Zafar
8.	Overview of replication,transcription and translation	LGIS	Dr. NailaZikria
9.	Blood sample collection and storage	Practical	Dr.RabiaShabbir
Week 03			
10.	Mutations	LGIS	Dr.AmbreenGul
11.	Role of genetics in cancer development	LGIS	Dr.AmbreenGul
12.	PCR (Molecular biology technique)	LGIS	Dr. RabiaShabbir
13.	Role of molecular biology in treatment of diseases	LGIS	Dr. NailaZikria

14.	Introduction to use of glassware	Practical	Dr. NailaZikria
Week 04			
15.	Enzyme classification	LGIS	Dr.RabiaShabbir
16.	Enzymes Mechanism of catalysis	LGIS	Dr. RabiaShabbir
17.	Properties of enzymes (coenzymes , cofactors)	LGIS	Dr. RabiaShabbir
18.	Factors affecting enzyme activity Enzyme kinetics	LGIS	Dr. RabiaShabbir
19.	Introduction to use of laboratory equipments I	Practical	Dr. RabiaShabbir
Week 05			
20.	Enzyme inhibitors	LGIS	Dr. RabbiaShabbir
21.	Regulation of enzyme activity	LGIS	Dr. RabiaShabbir
22.	Isoenzymes	LGIS	Dr. NailaZikria
23.	Clinical enzymology	LGIS	Dr. NailaZikria
24.	Introduction to use of laboratory equipments II	Practical	Dr. NailaZikria
Week 06			
25.	Test		All faculty
26.	Hemoglobin structure	LGIS	Dr. NailaZikria
27.	Hemoglobin function and types	LGIS	Dr. Naila
28.	Oxygen binding capacity of Hb	LGIS	Dr.Naila
29.	Introduction to spectrophotometer and Microlab	Practicle	Dr. RabiaShabbir
Week 07			
30.	Synthesis of heme	LGIS Integrated session	Dr. Ambreen and Dr. Ayesha

		Biochemistry and Physiology	
31.	Hemoglobinopathies	LGIS	Dr. AmbreenGul
32.	Degradation of heme	LGIS	Dr. Rabbia
33.	Hyperbilirubinemia and jaundice	LGIS	Dr. Rabbia
34.	Estimation of serum amylase by Microlab	Practical	Dr. NailaZikria
Week 08			
35.	Plasma proteins	LGIS Integrated session Biochemistry and physiology	Dr.Naila and Dr. Ayesha
36.	Hemolytic jaundice	CBL	Dr.Naila and Dr. Rabia
37.	Lipid classification and biomedical importance	LGIS	Dr.Naila and Dr.Rabia
38.	Estimation of cholesterol with microlab	Practical	Dr. Rabia
Week 09			
39.	Glycolipid , sphingolipids , cholesterol (chemistry , function and clinical significance	LGIS	Dr. Naila
40.	Immunoglobulins	SDL/ flip classroom	Dr.Naila
41.	Fatty acids , structure, classification, importance	LGIS	Dr. Naila
42.	Mobilization of F.A	LGIS	Dr. Ambreen
43.	Lipid profile by microlab I	Practical	Dr. Naila
Week 10			
44.	Beta oxidation of fatty acids	LGIS	Dr. Ambreen
45.	Ketogenesis and ketolysis	LGIS	Dr. Rabia
46.	Cholesterol synthesis	LGIS	Dr. Ambreen

47.	Hypercholesterolemia, obesity , Mediterranean diet	LGIS	Dr. Ambreen
48.	Lipid profile by microlab II	Practical	Dr.Rabia
Week 11			
49.	Lipoprotein metabolism I	LGIS	Dr. Ambreen
50.	Lipoprotein metabolism II	LGIS	Dr. Ambreen
51.	Lipid metabolism	SGD	Dr,Rabia and Dr. Naila
52.	Revision of practicals	Practical	Dr. Naila

	Oral biology BLOCK-I			
SR.NO	LEARNING OBJECTIVES	Week	MODE OF TEACHING	FACILITATOR
1.	Microscope, introduction and handling	Week 1	Practical	Dr.Umair
2.	Identify the embryological structures & processes in pictures	Week 3	SGD	Dr.Umair
3.	Identify in pictures/images developmental anomalies associated with incomplete fusion of facial processes.	Week 4	SGD	Dr.Umair
4.	Identify the pharyngeal apparatus, its derivatives, and associated anomalies in pictures Identify various palatal clefts in pictures	Week 5	SGD	Dr.Umair
5.	Draw the histological features of tooth development Primary epithelial band Vestibular lamina Dental lamina	Week 6	Practical	Dr.Umair
6.	Draw histological features of tooth development Bud stage Cap stage Early and late bell stage	Week 7	Practical	Dr.Umair

	Root formation			
7.	Identify the developmental anomalies of tooth in pictures and study models	Week 8	SGD	Dr.Umair
8.	Draw the histological features of amelogenesis Life cycle of ameloblast	Week 9	Practical	Dr.Umair
9.	Draw the microstructure and histological features of enamel. Incremental lines& perikymata Neonatal line Gnarled enamel Hunter shreger band	Week 10	Practical	Dr.Umair
10.	Draw the microstructure and histological features of enamel Rods and inter-rods	Week 10	Practical	Dr.Umair
11.	Identify the congenital anomalies associated with enamel	Week 11	SGD	Dr.Umair
12.	Draw the microstructure and histological features of dentin-pulp complex. Structure of odontoblast	Week 11	Practical	Dr.Umair
13.	Draw the microstructure and histological features of dentin-pulp complex Pulp and its zones	Week 12	Practical	Dr.Umair
14.	14.Draw the histological features of dentinogenesis.	Week 12	Practical	Dr.Umair

Oral Biology Morphology BLOCK-II				
SR.NO	LEARNING OBJECTIVES	WEEK	MODE OF TEACHING	FACILITATOR
1.	Permanent & deciduous teeth Identify teeth and their number on models	Week 1	SGD	Dr.Khadija
2.	Maxillary central incisor: Identification & discussion on models	Week 2	SGD	Dr.Khadija
3.	Maxillary central incisor: Draw and label graphically	Week 2	PRACTICAL	Dr.Khadija
4	Maxillary lateral incisor: Identification and discussion on models	Week 3	SGD	Dr.Khadija
5.	Maxillary lateral incisor: draw and label graphically	Week 4	PRACTICAL	Dr.Khadija
6.	Mandibular central incisor Identification & discussion on models	Week 5	SGD	Dr.Khadija

7.	mandibular central incisor draw and label graphically	Week 6	PRACTICAL	Dr.Khadija
8.	Mandibular lateral incisor: Identification & discussion models	Week 7	SGD	Dr.Khadija
9.	Mandibular lateral: Draw and label graphically	Week 8	PRACTICAL	Dr.Khadija
10.	Comparison of maxillary and mandibular incisors	Week 9	SGD	Dr.Khadija

Research Methodology

Sr. No.	Week	Topic / Theme	MIT	Instructor
1st Block				
1.	Week 3	Introduction to research and its importance	LGIS	Dr. FaizanMunir Khan
2.	Week 4	Introduction to the research process and types	LGIS	Dr. FaizanMunir Khan

Innovative Teaching Strategies

Case Based Learning Sessions

Interactive Case Studies: Presenting real-life cases or scenarios relevant to the subject were presented to students for their active learning. These cases were dissected, analyzed, and discussed collaboratively, encouraging critical thinking and application of knowledge.

Team-Based Learning (TBL):

Students were divided into small groups to foster collaboration and peer learning. Each group were assigned specific roles or tasks within the presentation, promoting teamwork and a sense of shared responsibility.

Integration of Multiple Disciplines:

Several horizontally and vertically integrated sessions that cover interdisciplinary topics has been incorporated in block I, integrating insights and perspectives from multiple disciplines to provide a holistic understanding of the subject matter and encourage interdisciplinary collaboration.

Learning Resources

1.Physiology

TEXTBOOKS

1. Guyton and Hall
   Textbook of Medical Physiology 14th Edition.

REFERENCE BOOKS

2. Mushtaq Ahmed Essentials of Medical Physiology Vol. 1 and 2 5th Edition
3. Lauralee Sherwood Human Physiology 9th 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 (13th Edition)	Netter's Embryology Atlas

The Developing Human By Keith L-Moore (10th Edition)	
Histology	
Medical Histology By Prof LaiqHussain (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)	
Neuroanatomy	
Snell's Neuroanatomy	
OTHER LEARNING RESOURCES	
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 availaboratoryle 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.