DENTAL COLLEGE HITEC-IMS

1st Year BDS

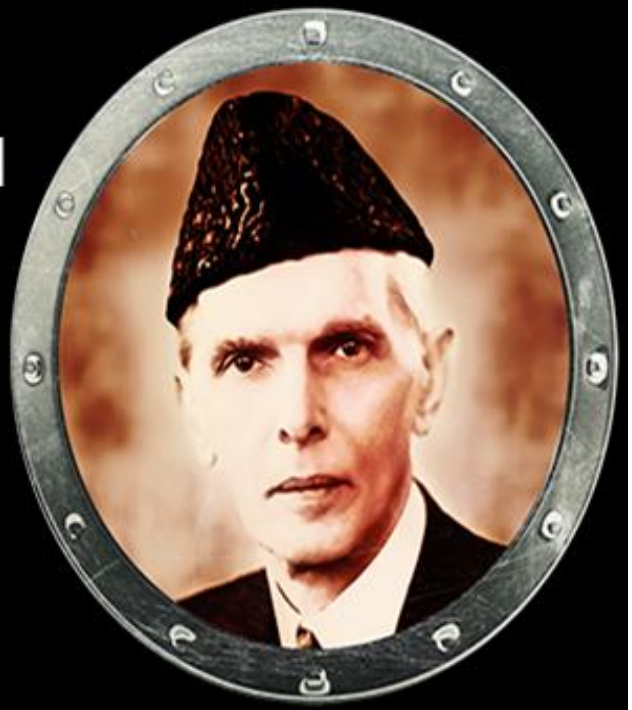
(Essentials of medicine and dentistry II) Block II Curriculum

(Revised Curriculum (2024)

(Version-I)

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

Muhammad Ali Jinnah



Contents

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 HaematoxylinAnd 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

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Assistant Professor

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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 along important vertical and horizontal dimensions. The content taught is integrated concurrently in the horizontal organization and vertically across the years of the BDS Program. The course of the 1styear is divided into three blocks. In each block, the sequencing of the content is logical and integrated.

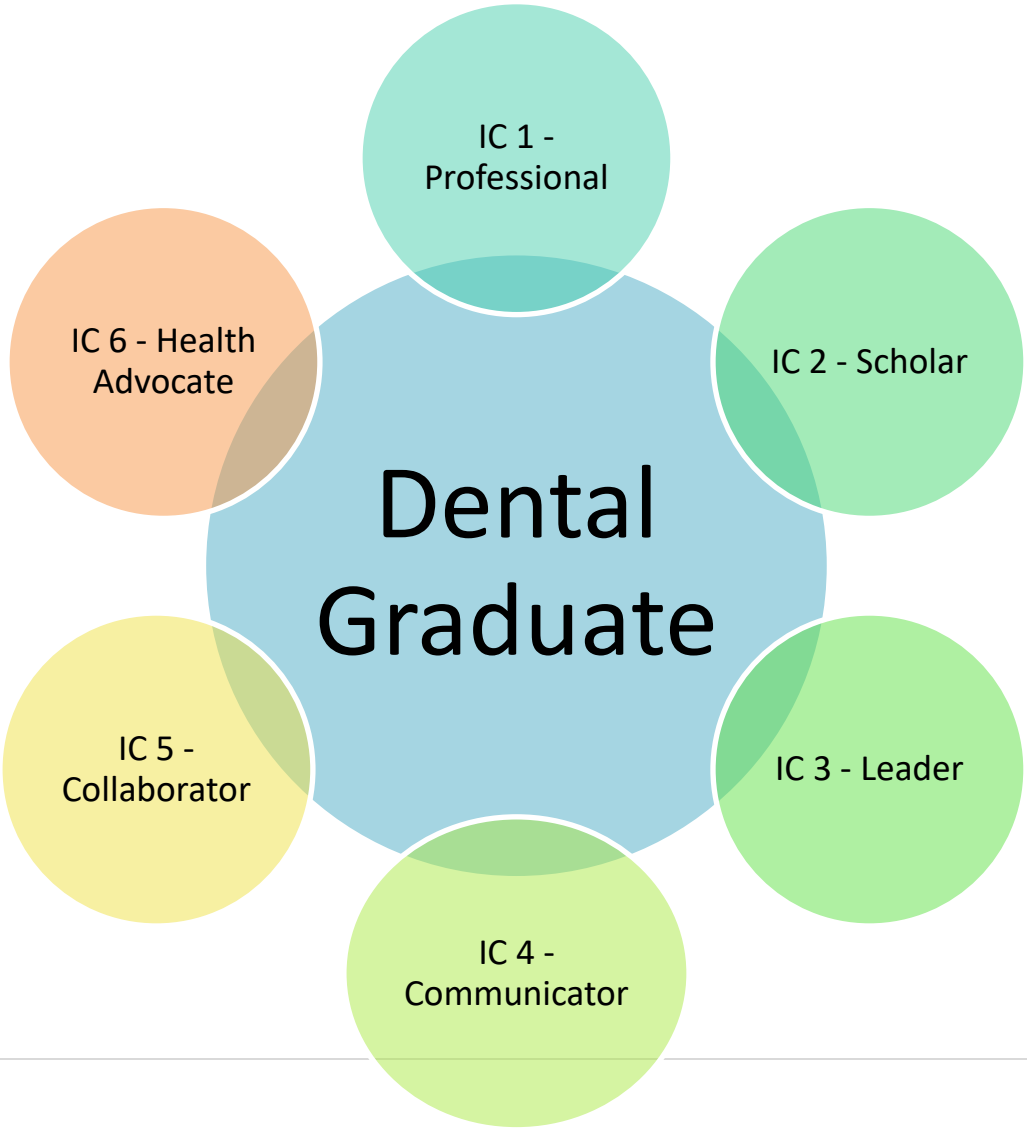
Teaching Strategies

Multiple teaching strategies are used. LGIS is used to provoke thought and understanding and to standardize 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 the clinical implications of each topic to integrate basic and clinical sciences. This encounter is based on an 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-onreal-life, contextual learning experience.

Assessment

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, the annual professional examination is conducted according to the standards outlined by NUMS.

Institutional Competency Framework



Alignment of Block Outcomes with Institutional Competencies

S.No.	Block Outcomes	Block Outcome Codes	Institutional Competencies
1.	Discuss the physiological functions of different glands with their clinical implications	Y1-B2-OC1	IC 1 to IC 6
2.	Discuss the physiological mechanism and functions of vision,hearing, taste, and smell with their clinical application	Y1-B2-OC2	IC 2, IC 6
3.	Relate the biochemical role of proteins and phospholipids in health and disease (respiratory system and neurodegenerative diseases)	Y1-B2-OC3	IC 1 to IC 6
4.	Discuss the normal anatomy and histology of periodontal tissue with their clinical implications	Y1-B2-OC4	IC 2 to IC 6
5.	Discuss the gross morphological features of permanent and deciduous dentition	Y1-B2-OC5	IC 2 to IC 6
6.	Discuss the role of genetics in cancer and aging	Y1-B2-OC6	IC 2 to IC 6
7.	Appraise the anatomy of the lungs and diaphragm with clinical conditions	Y1-B2-OC7	IC 2 to IC 6

8	Apply enhanced English communication skills through interpretation of various literary and non-literary sources, while comparing the inter-cultural variations in the use of the English language.	Y1-B2-OC8	IC 2 ,IC 4

Calculation & Distribution of Academic Contact Hours

Summary of MITs Along with Distribution of Hours

Proposed contact hours for Block II according to the Academic Calendar

Sr.No	Discipline	Lecture Hours in Block II	Practical contact hours achieved in Block II	Total contact hours achieved
1.	Anatomy	**81 hrs**	**11 hrs 40 mins**	**93 hrs 20 mins**
2.	Physiology	69	13	82
3.	Biochemistry	47	13	60
4.	Oral biology	37	31	68

Proposed Contact Hours for Block II According to Academic Calendar

Subject	MIT	No.	Hours In 13 weeks
Physiology	LGIS	47	47.6
	CBL/SGD	13	13.6
	Integrated sessions	5	5.5
	Practical	13	13.5
		Total hours =	78.5hrs
Biochemistry	LGIS	42	38 hours 30 min
	CBL	1	1hr 20 min
	Integrated sessions	2	3hrs
	Practical	9	10 hr 30 mins
		Total hours =	**52 hrs 20 mins**
Anatomy	LGIS	25	30 hrs
	CBL/PBL	5	3hr20 min
	SGD	30	46hrs
	Integrated sessions	1	2hrs
	Practical	9	10 hours 30 mins
		Total hours =	
Oral Biology	LGIS	35	35
	CBL/PBL	02	2
	SGD	14	12
	Integrated sessions	3	3
	Practical	14	12
		Total hours =	**64**
Leader Ship & Management	LGIS		
Islamiyat /Pak Studies	LGIS	07	5hrs 30min
QURAN KAREEM	LGIS	09	6hrs 40min
English	LGIS	02	1 hour 40 min
Introduction to Research	LGIS		

Structured Summary of Block I

Code	Y1-B2-D24
Name	Essentials of medicine and dentistry II
Duration Of Block	15 (10+3+2)
Important Dates	10academics 1 week(Eid ulAzaah)3wkssummer vacation 2 block exam
Horizontally Integrated Themes	Respiration
Vertically Integrated Themes	Growth and development of bone Alveolar Bone pathologies Periodontology, oral pathology, Prosthodontics, orthodontics & operative
Prerequisite Block(s)	Block 1

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	**26February 2024 to 3rd March 2024**
Academics 9/12 Weeks	**4th March 2024 to 18th May 2024**
Public Holiday	**23rd March (Pakistan day)**
Eid ulFitr Holidays (1 Week)	**08thApril 2024 to 14th April 2024**
1st Term exam	**20th May 2024 to 2nd June 2024**
SECOND TERM (11 Weeks)	
Academics 2/10 Weeks	**3rdJune 2024 to 16thJune 2024**
Summer Vacations + Eid ul Azha (3 Week)	**17th June 2024 to 7th July 2024**
Academics 8/10 Weeks	**8th July 2024to 1st September 2024**
Public Holiday	**16th – 17th July (Ashura) 14th August (Independence Day)**
2nd Term Exam	**9th September2024to 20th September 2024**
THIRD TERM (14 Weeks)	
Academics12/12 Weeks	**23th September 2024 to 16th December 2024**
Send up / Pre-Prof Exam (2 Weeks)	**16th December 2024 to 27th December 2024**
Prep Leaves for Prof (23 days)	**27th December 2024to 26th January 2025**
Final Professional Exam	**27th January 2025**

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

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.

Tentativeof Block Exam Schedule

a.

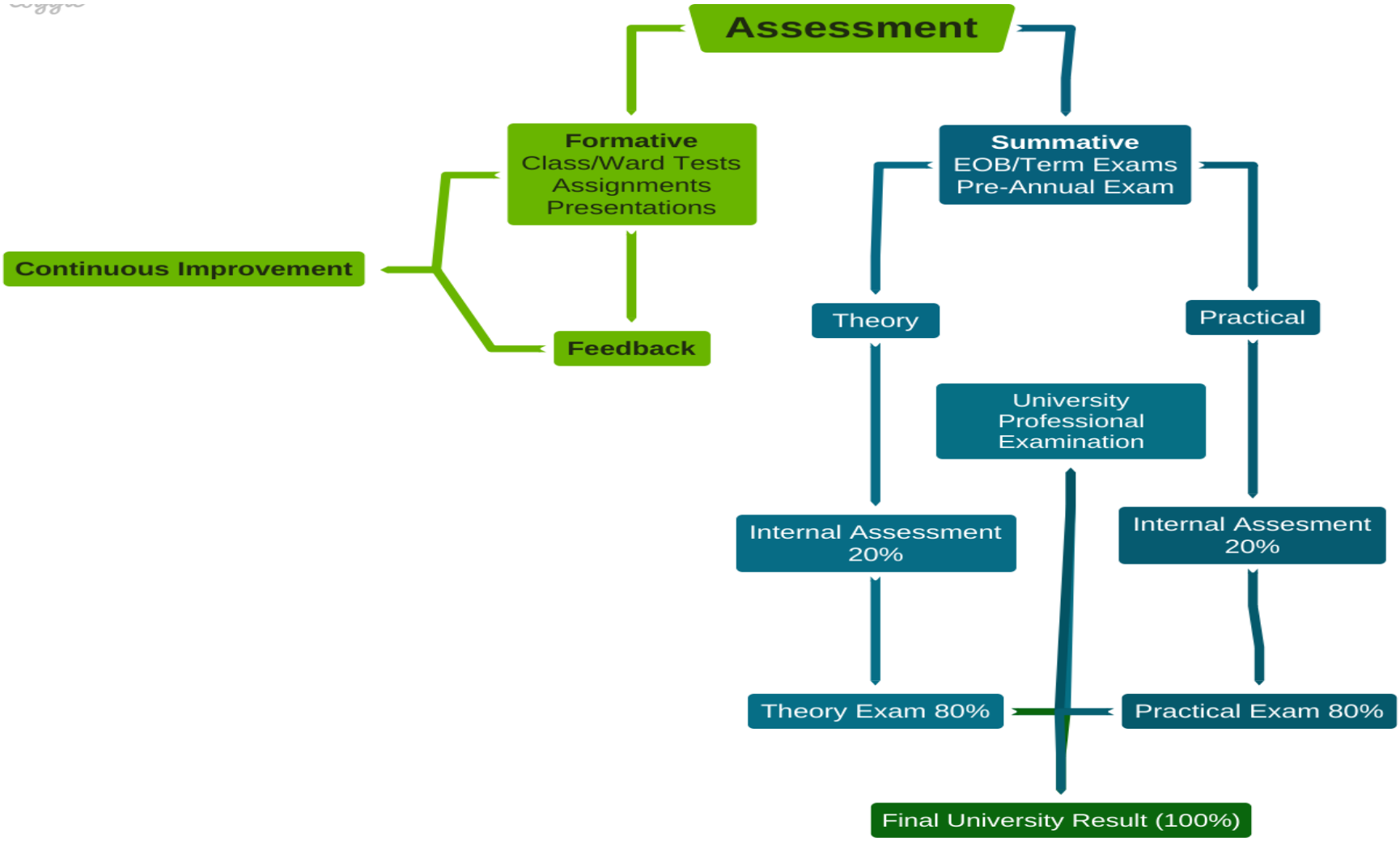
Theory Exam Schedule Block – II				
	DAY	**DATE**	**TIME**	**VENUE**
Essential of Medicine -I	Tuesday	10th Sep ,2024	09:00 AM- 12:00PM	Dental Exam Hall
Essential of Dentistry-I	Friday	13th Sep 2024	09:00 AM- 12:00 PM	Dental Exam Hall
Expository writing	Friday	20th Sep 2024	09:00 AM - 3:00 PM	Assessment

OSPE and VIVA VOCE Time 09: 00 AM to 03:00 PM			
DATE	DAY	Essentials of Medicine-I	Essentials of Dentistry -I
16th Sep 2024	Monday	Batch A	Batch B
18th Sep 2024	Wednesday	Batch B	Batch A

TentativeClass Test Schedule

DATE	SUBJECT	DAY
30th July-24	Anatomy	Tuesday
05th August-24	Biochemistry	Monday
12th Augut-24	Physiology	Monday
26th August-24	Essential of Medicine-I	Monday

Assessment Map



BLOCK-II

Learning Outcomes for Block II

Anatomy study guide (learning outcomes)

ANATOMY				
Topic/ Theme	**Learning Outcomes**	**Learning Objectives / Contents**	**Instructional Strategy**	**Assessment Tool**
	By the end of the module students will be able to:			
GENERAL EMBRYOLOGY				
Developmentofskull	Comprehend the embryologicalbasis behind the development of skull, correlate them with various relevant clinical presentations	• Identify the sources of skull • Classify Skull on embryological basis • Describe the events in development of cartilaginous and membranous neurocranium and viscerocranium • Outline features of a newborn skull. Identify the fontanelles with reference to their location, closing time and clinical significance • Explain the embryological basis of microcephaly and various types of craniosynostosis	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Gross(Head)				
Skull	Elucidate the topographicanatomy of skull	• Appreciate the general plan of studying skull from different views. • Identify important bony landmarks on the bones as viewed from lateral, superior, inferior, anterior and posterior views. • List structures traversing the foramina in these bones • Identify the bones forming the boundaries of orbit, nasal cavity. oral cavity, temporal, infratemporal fossa		

		&pterygopalatine fossa on the given bone. (detail to be donewith relevant topics)		
Scalp	Correlate the structure and neurovascularsupply of scalp with an anatomical basis of relevant clinical conditions.	Appraise extent of scalp on model Enumerate layers of scalp in a sequential order Correlate gross features of each layer with anatomical basis of black eye, profuse bleeding, gaping wound, spread of scalp infection and shape of hematoma		
Temporal &infratemporal region	Correlatethelocation, boundaries, and contents of temporal and Infratemporal fossa with relevant clinical conditions	• Identify the location, boundaries, contents and communications of temporal and infratemporal fossa on a given model and skull. • Describe the course and distribution of mandibular nerve from origin to distribution • Tabulate the attachments, actions and nerve supply of muscles of mastication. • Trace location, various routes and distribution of otic ganglion • Justify role of lateral pterygoid as a peripheral heart on anatomical basis of pterygoid venous plexus • Elucidate importance of pterygoid venous plexus in case of intracranial spread of infection to cavernous sinus. • Trace origin and distribution of superficial temporal, first and second parts of maxillary artery	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Pterygopalatine fossa	Describe the anatomy of Pterygopalatine fossa inrelation with surrounding structures	• Identify the location of pterygopalatine fossa on skull • Enumerate the contents and communications • Describe the distribution of third part of maxillary artery, nerve and pterygopalatine ganglion • Justify the role of pterygopalatine ganglion in hay fever/allergies	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE

Noseand paranasal sinuses	Correlate the gross anatomy of Nose and paranasal sinuses with relevantclinical conditions	• Describe the skeletal framework of different walls of nose • Describe the features, vascular supply, nerve supply and openings in lateral wall of nose • Describe the features, vascular supply, nerve supply of medial wall of nose • Highlight the significance of little's area in a case of epistaxis • Trace the location and drainage of paranasal sinuses in skull and on Radiograph	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Hard and softPalate	Correlate the gross anatomyof hard and softpalatewiththeir relevant clinical conditions	• Discuss the bony framework of hard palate. • Identify the gross features of hard palate and soft palate. • Identify muscles of soft palate on the model • Describe the attachments, nerve supply and actions of muscles of soft palate • Describe blood supply and nerve supply of soft palate • Identify the main muscles forming the palatoglossal and palatopharyngeal Arches	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Mandible	Elucidate the topographicanatomy of mandible	• Identify parts of mandible • Describe ramus and body of mandible concerning its bony features and attachments.	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Submandibular region	Correlate the anatomy of Submandibularregion with its clinical significance	• Revisit boundaries of the submandibular triangle • Describe the parts, relations, neurovascular of submandibular gland. • Trace the routes of submandibular ganglion • Describe the distribution of submandibular ganglion • Correlate the anatomy of submandibular fascial space with Ludwig's angina	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
TMJ	Correlate the Gross anatomical features of temporo-mandibularjointwith	• Identify thetype ofTMJ. • Identify the articular surfaces of TMJ on a given model or dry bones. • Explain the attachments of capsule.	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE

	clinical significance	• Name the ligaments of TMJ. • Describe the attachmentsand relations of ligaments of TMJ. • Describe the type and shape of articular disc. • Justify the presence of two joint cavities and types of movements occurring in each. • Describe the movements of jaw at TMJ with special reference to axis and muscles producing them. • Describe the clinicalsignsofanterior dislocation of TMJ and explain the steps of its reduction.		
Oral cavity	Correlate the gross anatomyoforalcavity and tongue with anatomical basis of relevant clinical conditions	• Name different boundaries of oral cavity. • Describe blood and nerve supply and lymphatic drainage of oral cavity. • Identify the location of inferior alveolar nerve block • Describe the salient features of floor of mouth. • Discuss the attachments, actions, nerve supply and relations of suprahyoid muscles • Identify parts of tongue • Identify the gross features of dorsal and ventral surfaces of tongue • Name the intrinsic and extrinsic muscles of tongue. • Describe attachments, actions and nerve supply of muscles of tongue • Describe the motor, general and special sensory innervation of tongue	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Pharynx	Correlate the gross anatomy ofpharynxwith relevantclinical conditions	• Differentiate extent, anatomical features, vascular supply, nerve supply of three parts of pharynx on anatomical basis • List muscles of pharynx	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE

GrossAnatomy (Neck)				
Cervical vertebrae		• Differentiate typical and atypical cervicalvertebraeGivedistinguishing features of each cervical vertebra. • Enumeratestructurespassingthrough foramina • Outline ligamentous Attachmentsoncervical vertebrae	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Jointsofneck	Correlatethe gross anatomical features of the ofjointsofneckwith their clinical significance	• Namethe typicaland atypical intervertebral joints of neck. • Identify the types of atlanto- occipital and atlanto-axial joints. • Describe the movements of these joints with muscles producing them	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Face	Correlate the gross anatomyoffacewith anatomical basis of relevant clinical conditions	• Outlinethecharacteristic features of facial skin. • Elucidate the cutaneous innervation of face • Group facial muscles according to the orifices they are guarding • Describe the nerve supply of muscles of facial expressions. • Describe the course of arteries, veins, lymphatics and nerves of the face with the help of model. • Correlate gross features of face with anatomical basis of danger area, trigeminal neuralgia, Bell's palsy. **Skills** • Identify muscles of facial expressions Illustratethecutaneousinnervationofface	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Mandibularand maxillary branches of Trigeminal nerve	Correlate the anatomy of mandibular and maxillary divisions of Trigeminalnervewith their lesions	• Describe the pathway of mandibular nerve from nucleus to target organs • Describe the pathway of maxillary nerve from nucleus to target organs. • Describe the lesion of nerves with special reference to infections of molar teeth.	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE

Facialnerve	Correlate the anatomy of facial nervewithitslesions	• Revisit the course and distribution of facial nerve • Revisit the relationship of facial nerve with pterygopalatine and submandibular ganglia • Revisit the effects of lesion of facial nerve at different levels • Differentiate anatomical basis of clinical presentation of UMN and LMN lesion of facial nerve.	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Parotid region	Correlate the anatomy of parotid regionwithitsclinical significance	• Trace the pathway of autonomic supply of parotid gland. • Enumerate structures embedded in parotid gland in a sequential order. • Analyze anatomical basis of clinical presentation of mumps. • Correlate the extra cranial course of facial nerve with Bell's palsy.	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Deepcervical Fascia	• Anatomize the four layers of deep cervical fascia in detail. • Correlate the topography of cervical fascial spaces to mediastinal and contralateral spread of infection.	• Enumerate the layers of deep cervical fascia. • Trace the attachments of investing, pre-tracheal, carotid sheath and prevertebral layers of fascia. • Identify various modifications and neck spaces formed by fascial attachments. • Comprehend the clinical importance of neck spaces in spread of infection	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Prevertebral regionandroot of the neck	Describe skin, superficial fascia, and cutaneous nerves of the prevertebral region along with the action and nerve supply of muscles present here	• Enumerate the prevertebral muscles • Describe origin, insertion, action and nerve supply of prevertebral muscles • Identify the boundaries of pyramidal space. • Describe the peculiar arrangement of prevertebral fascia in prevertebral region and justify formation of axillary sheath around axillary artery and brachial plexus but not axillary vein. • Anatomize the relations of key muscle of root of neck (scalenus anterior) • Describe the parts and branches of subclavian artery.	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE

Backoftheneck	Link the anatomical location and contents of triangles present at the back of neck with their clinical significance	• Enumerate the muscles of back of neck. • Identify the boundaries and contents of suboccipital triangle. • Describe the course and relations of 3rd and 4th parts of vertebral arteries.	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Muscles of theneck	Describe the origin, insertion, movements, and nerve supply of the muscles present in neck	• Describe the muscles of neck (sternocleidomastoid, trapezius and infrahyoid muscles) along with their nerve supply with the help of models. • Enlist the features of Torticollis	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Triangles ofneck	Link the anatomical location of triangles of neck and their contents with their clinical significance	• Tabulate the attachments, nerve supply, actions of superficial and deep muscles of neck (sternocleidomastoid, suprahyoid, infrahyoid, sub occipital, prevertebral muscles,). • Identify boundaries and contents of triangles of neck on model • Describe the origin, course and distribution of nerves of neck (cervical plexus, Ansa cervicalis, Common carotid artery, Internal jugular vein, subclavian vessels)	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Vesselsofneck	Correlate the anatomy of each vessel with its area of supply and drainage	• Enumerate the main vessels in neck. • Describe the course and branches of -External carotid artery -Subclavian artery -External jugular vein -Internal jugular vein	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Nervesof neck	Correlate the anatomy and distribution of cranial nerves with lesions associated with their injuries	• Enumerate the main cranial nerves supplying in neck • Trace the distribution of cranial nerves • Enumerate branches of each of the above nerve and identify their area of supply.	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Visceraof neck	Correlate the anatomy of viscera's present in neck with their	• Appraise the relations of trachea and esophagus in neck region with the help of dissection • Describe the structures involved in cricothyroidotomy and Tracheostomy with the help of dissection	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE

	relevant clinical significance			
Thyroid andparathyroid	Correlate the gross anatomy of thyroid and parathyroid glands with relevant clinical conditions	• Identify gross features of thyroid and parathyroid glands on models. • Describe capsule, relations and blood supply of thyroid and parathyroid • gland • Justify the anatomical basis of movement of thyroid gland during deglutition • Discusssurgicalprecautionsin thyroid Surgerywhileligatingvesselsand enucleation	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Larynx	Correlate the gross anatomy of larynx with relevant clinical conditions	• Describe laryngeal wall in detail with emphasis on cartilages, ligaments, muscles, vascular supply and nerve supply. • Analyze mechanism of abduction and adduction of vocal cords • Distinguish clinical presentations of injury to external, internal and • recurrent laryngeal nerves	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Lymphatic drainage of the head and neck	Appraise the lymphatic drainage of neck with understanding of relevant clinical conditions on anatomical basis	• Enlist the groups of lymph nodes of neck. • Describe their location and areas of drainage • Appraise the formation of jugular lymph trunk • Correlate the clinical importance of lymphatic drainage of head and neck	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Orbit	Correlate the anatomy of orbital contents with relevant clinical significance	• Describe the skeletal framework of bony orbit and its communications • List the contents of orbit • Identify the parts of eyeball on a model • Tabulate the attachments, nerve supply and actions of extraocular muscles • Justify the movements of extraocular muscles based on their attachments • Trace the course and distribution of III, IV and VI Cranial	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE

		Nerves • Justify the peculiar Position of eyeball in case of lesion of III, IV and VI Cranial Nerves • Trace the route and distribution of ciliary ganglion. • Describe the course and distribution of ophthalmic nerve • Describe the nerve supply of Lacrimal gland		
Lacrimal apparatus	Correlatethe anatomy of lacrimal apparatus with relevant clinicalsignificance	• Enumerate the structures forming lacrimal apparatus • Describe the nerve supply of lacrimal apparatus • Correlate the anatomical structures of lacrimal apparatus with the features of blocked Lacrimal duct	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE
Ear	Correlate the gross anatomy of ear with relevant clinicalconditions	• Describe the gross anatomical features, boundaries, structures and contents of middle ear cavity. • Describe the structures forming the walls of middle ear cavity on the given model. • Highlight the importance of infection in middle ear cavity in relation to its communications. • Trace the pathway and distribution of facial nerve within petrous part of temporal bone.	▪ Lectures ▪ SGD	▪ MCQ/ SEQ ▪ Viva ▪ OSPE

1. Physiology

Learning Outcomes of Block II - Physiology

2. Learning Outcomes of Block II -Physiology

S.No.	Topics/Theme	Learning Outcomes By the end of this block students should be able to:	Learning Objectives	IC Codes	MITs	Assessment Tools
Respiration						
1.	Introduction to Respiratory System	•Correlate the anatomy of respiratory tract with its functions • Appreciate the role of conductive and gas exchange zones of lungs	**Knowledge** • Recognize the functional anatomy of various parts of respiratory system • Highlight the non-respiratory functions of respiratory tract	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
2.	Pulmonary Mechanics	• Analyse the mechanics of respiration •Analyse lung volume and pressure changes during quiet and forceful breathing	**Knowledge** • Distinguish functions of inspiratory and expiratory muscles during quiet and forceful respiration • Correlate normal lung volumes/ capacities to various pressures and volume changes during forceful respiration and changes in volume	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva

			and capacities			
3.	Pulmonary Compliance	Explain factors determining pulmonary compliance	**Knowledge** • Discern lung and chest wall compliance • Identify composition & role of surfactant in alveolar surface tension • State the concept of work of breathing	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
4.	Respiratory Membrane & Diffusion of Gases	Compare the different modes of gas transport in blood	**Knowledge** • Appreciate the layers of respiratory membrane in detail • Appraise concept of diffusing capacity through respiratory membrane • Identify factors affecting gas diffusion through respiratory membrane	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
5.	Diffusion of gases & Oxygen transport	• Compare the different modes of gas transport in blood	**Knowledge** • State the mechanics of oxygen diffusion from alveoli to blood • Distinguish mechanism of oxygen transport in the arterial blood, tissue fluid and cell	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
6.	Oxygen transport & Dissociative curve	• Compare the different modes of gas transport in blood	**Knowledge** • Identify the role of Haemoglobin in oxygen transport •Analyse normal oxygen-	IC 2	LGIS SDL	MCQs SEQs/SAQs Structured Viva

			hemoglobin dissociation curve by explaining factors that shift oxygen-hemoglobin dissociation curve to right and left			
			Skill • Determine ESR by Westergren method	IC 4 IC 5	Practical demonstration	OSPE
			Attitude • Follow proper dress code of a medical laboratory • 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 checklists
7.	Carbon dioxide transport	• Compare the different modes of gas transport in blood	**Knowledge** • Identify various chemical form in which $C0_2$ is transported in blood • Discern normal $C0_2$ dissociation curve explaining Bohr effect, haldane effect and chloride shift	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
8.	Hypoxia and Cyanosis	Compare and contrast between Hypoxia and Cyanosis	**Knowledge** • Differentiate between hypoxia and cyanosis • Explain types of hypoxia and cyanosis • Describe manifestation of hypoxia and cyanosis	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva

9.	Nervous regulation of respiration	• Compare the chemical and neural regulation of respiration during rest and exercise • Correlate ventilation with perfusion in different lung zones	**Knowledge** • State different group of neurons composing respiratory centre • Review nervous control of inspiration and respiratory rhythm • Recognize the regulatory mechanism of Hering Breuer inflation reflex	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
10.	Chemical regulation of respiration	• Compare the chemical and neural regulation of respiration during rest and exercise • Correlate ventilation with perfusion in different lung zones	**Knowledge** • Appraise location, function and stimulation (by $C0_2$ and H+) of central chemosensitive area • Identify the role of peripheral chemoreceptors for control of respiration • Determine the composite effects of $PC0_2$, pH, & $P0_2$ on alveolar ventilation	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva

Endocrinology						
1	Basics of endocrinology & Mechanism of action of hormones	• Appraise the mechanisms of action of hormones	**Knowledge** • Identify the various hormone receptors and their activation • Explain the mechanism of intracellular signaling after hormone receptor activation • Explain the second messenger mechanisms for mediating intracellular hormonal functions • Identify the hormones that act mainly on the genetic machinery of the cell	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
2	Hormones of hypothalamus and Pituitary gland	• Explain the mechanisms of action of hormones	**Knowledge** • Explain the pituitary gland and its relation to the hypothalamus • Summarize the hypothalamic-hypophysial portal blood vessels of the anterior pituitary gland and its significance • Recall the functions and regulation of growth hormone • Differentiate between hypopituitarism and	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva

			hyperpituitarism and its pathophysiological basis • Explain the posterior pituitary gland and its relation to the hypothalamus • Describe the physiological functions of ADH and oxytocin hormone			
3.	Thyroid gland	• Explain the mechanisms of action of hormones	**Knowledge** • Recall the synthesis and secretion of the thyroid hormone • Explain the functions of the thyroid hormone • Summarize the regulation of thyroid hormone secretion • Identify the disorders of the Thyroid gland and their pathophysiological basis	IC 2	LGIS/ Journal Club/Flip class room	MCQs SEQs/SAQs Structured Viva/Presentations
4.	Calcium regulating hormones	• Explain the mechanisms of action of hormones	**Knowledge** • Explain the regulation of calcium and phosphate in the extracellular fluid and plasma • Enlist the actions of vitamin D Explain the effect of parathyroid hormone on calcium and phosphate concentrations in the extracellular fluid	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva

			• Summarize the control of parathyroid secretion by calcium ion concentration • Describe the actions of calcitonin • Explain the pathophysiology of parathyroid hormone, vitamin D, and bone diseases			
5.	Hormones of adrenal cortex	• Discuss the mechanisms of action of hormones	**Knowledge** • Explain synthesis and secretion of adrenocortical hormones • Enlist the functions of aldosterone • Enlist functions of the glucocorticoids • Describe the disorders of adrenocortical secretion and their pathophysiological basis	IC 2	LGIS/ Journal Club/Flip class room	MCQs SEQs/SAQs Structured Viva/Presentations
6.	Pancreas	• Discuss pathophysiological basis of glucose regulation	**Knowledge** • Explain glucose metabolism with its regulation	IC 2	LGIS/ Journal Club/Flip class room	MCQs SEQs/SAQs Structured Viva/Presentations

Special Senses						
1.	Physiology of Eye	•Explain the physiology of optical system of eye and understand errors of refraction	**Knowledge** •Explain refraction and concept of convergence and divergence •Define focal length, focal point and power of lens •Differentiate between emmetropia, myopia, hyperopia, astigmatism, presbyopia and describe their treatment	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
			Skill •Perform the superficial reflexes	IC 4 IC 5	Practical demonstration	OSPE
			Attitude • Follow proper dress code of a medical laboratory • 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 checklists

		Corelate physiological anatomy of retina with its neural functions	**Knowledge** •Explain physiological anatomy of retina •Discuss photochemistry of vison •Explain visual pathways and accommodation reflex pathways	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
2.	Physiology of Ear	•Explain the physiology of middle ear	**Knowledge** •Describe the physiological anatomy of ear •Explain the mechanism of conduction of sound waves through the ear to the cochlea •Describe "Impedance Matching" and its importance •Describe the process of attenuation of sounds	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
			Skill •Examine the Cranial Nerves (1st till 6th)	IC 1 IC 4	Practical demonstration	OSPE
			Attitude • Follow proper dress code of a medical laboratory • Maintain his/her workstation according to the prescribed SOPs • Report any damage to lab equipment immediately	IC 1 IC 4	Practical demonstration	Formative checklists

3.	Physiology of taste	•Explain the physiology of taste sensation and its pathway	**Knowledge** •Describe the primary sensations of taste •Describe the mechanism of stimulation of taste buds and the transmission of signals to CNS	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva
			Skill •Examine the Cranial Nerves (7th till 12th)	IC 1 IC 4 IC 5	Practical demonstration	OSPE
			Attitude •Follow proper dress code of a medical laboratory •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 checklists
4.	Physiology of olfaction	•Explain the physiology of olfaction and its pathway	**Knowledge** •Explain the physiological anatomy of olfactory membrane •Explain the mechanism of stimulation of olfactory cells •Identify the primary sensations of smell •Describe the transmission of signals of olfaction into the central nervous system	IC 2	LGIS	MCQs SEQs/SAQs Structured Viva

BIOCHEMISTRY					
MODULE –V ; RESPIRATORY SYSTEM DURATION ; 02 WEEKS					
Topic/ Theme	**Learning outcomes**	**Learning Objectives/Contents**	**Instructional strategies**	**Code of IO**	**Assessment tool**
Biochemistry of body fluids	Demonstrate understanding of biochemistry of body fluids	**Knowledge:** • Ionization of water and weak acids and bases • Concept of pH and pH scale • Dissociation constant & titration curve of weak acids, the concept of pK values) • Distribution of bodyfluid • Water turn over and balance • Biomedical Importance of Osmosis, Osmotic pressure, surface tension, viscosity & their importance related to body fluids	• LGIS • SGD	• IO-1	• MCQ • SAQ/SEQ Structured viva
Phospholipids	Appraise the chemistry of phospholipids and Relate the knowledge of phospholipids in respect to	**Knowledge:** Chemistry , biomedical significance and structure of phospholipids	• Lectures SGD	•	• MCQ • SAQ/SEQ • Structured viva

	respiratory system				
Respiratory Proteins	Relate the knowledge of biochemical basis of respiratory proteins	**Knowledge:** Chemistry & biomedical significance of respiratory proteins (alpha 1 anti trypsin)	• Lectures SGD	•	• MCQ • SAQ/SEQ • Structured viva
		Skill: Preparation of solutions	• Practical • Demonstration	• IC4 • IC5	• OSPE
		Attitude: **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 Maintain work station according to SOPs	•	• IC1 • IC4 • IC5	• Formative checklist
MODULE VI; ENDOCRINOLOGY & METABOLISM **Duration: 04 weeks**					
Cancer and tumor	Apply the basic	**Knowledge:**	• LGIS	•	• MCQ

markers	knowledge of biochemistry for understanding cancer and biochemical changes in cancer cells	Biomedical importance and Fundamental features of carcinogenesis Oncogenes and tumor suppressor genes and key role in carcinogenesis Tumor biomarkers	• SGD		• SEQ/SAQ • Structured viva
Neurotransmitters	Relate the importance of various neurotransmitters and its clinical significance	**Knowledge:** • Write a note on Catecholamines, their chemistry, synthesis and degradation, biochemical role • Explain role of Acetylcholine, Dopamine, Serotonin and Histamine, Glutamate , GABA & NO	• LGIS • SGD	•	• MCQ • SEQ/SAQ • Structured viva
Eicosanoids Metabolism	Apply the knowledge of eicosanoids for understanding its role in inflammation	**Knowledge:** • Introduction and function of eicosanoids and related clinical significance	• Lectures SGD	•	• MCQ • SAQ/SEQ • Structured•viva
Aging & free radicals	Apply the basic knowledge of biochemistry for understanding aging and its	**Knowledge:** • Different reactive oxygen species(ROS) produced by the human body • Mechanism of production of reactive oxygen	• Lectures • SGD	•	• MCQ, SAQ/SEQ • Structured viva

	biochemical changes	species(ROS)Effect of ROS on health and disease Mechanism of Scavenging of ROS • Biochemical role of antioxidant (Vit E, Vit C, Glutathione , Lipoic acid , CoQ10 and NADPH)			
MODULE VII **Duration: 04 weeks**					
Protein Chemistry & Metabolism	Relate the significance of different proteins in medicine	**Knowledge:** • Definitions, Biomedical importance of proteins • classification of proteins based on: • Physiochemical properties • Functional properties • Nutritional properties • Amino acids, their structure , properties and functions • Classification and nutritional significance of amino acids Structure of proteins and their significance Immunoglobulins and their	• LGIS • SGD	• IO-1IO- • IO-2 • IO-5	• MCQ • SAQ/SEQ Structured viva

		biomedical significance Plasma proteins & their clinical significance Amino acid oxidation, transamination, deamination, decarboxylation, deamidation and transamination Transport of Ammonia Ammonia intoxication • Urea cycle			
		Skill: • Color reactions of proteins I, Ninhydrin test, Biuret test • Color reactions of proteins II, Xanthoproteic test, Aldehdye test, Millon Nasse Test Color reactions of proteins III, Sulphur Test	• Practical • Demonstration	• IC4 • IC5	• OSPE

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	IC1 IC 4 IC5 Formative Checklist

		lab • Report any damage to lab equipment immediately	
Cleanliness of work station	To arrange the required apparatus and chemicals safely (All Modules)	Maintain work station according to SOPs	

LIST OF BIOCHEMISTRY PRACTICALS
BLOCK II

S. No	Experiments
1.	Preparation of solution
2.	Color reactions of proteins I, Ninhydrin test, Biuret test,
3.	Color reactions of proteins II, Xanthoproteic test, Aldehdye test, Millon Nasse Test
4.	Color reactions of proteins III, Sulphur Test

Essential Of Dentistry-Oro facial biology II

Essential Of Dentistry-Oro facial biology II

DENTAL & PERIODONTAL TISSUES
IN HEALTH & DISEASE I

Module (4 weeks)

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Periodontium	Relate the developmental and histomorphological knowledge of periodontium to different clinical scenarios	KNOWLEDGE • Classifycementoenamel junctionin terms of enamel and cementum overlappingalso discuss clinicalsignificance • Describe histologicalappearance andsignificance ofcementodentinal • Discuss age relatedchanges occurring incementum in terms ofappearance, thickness,cementicles and repairprocess • Describe periodontalligament development,location, average width,content (names of cells,types of collagen fibers,elastic and reticularfibers, groundsubstance) function,remodeling and agechanges • Enumerate the fiveprincipal fiber bundles ofperiodontal ligament • Describe blood supply ofperiodontal ligament in terms of names of bloodvessels, branchingpattern, routes, plexus,location, diameter,difference in	□ Lectures □ SGD	SEQs MCQ □ Viva □ OSPE

		vascularityof anterior vs posteriorteeth, mandible vsmaxillary teeth. • Discuss nerve supply ofperiodontal ligament interms of names ofnerves, types of nervefibers, location andbranching • Discuss names,locations, histologicalappearance, andfunction of nerveendings present inperiodontal ligament • Discuss histologicalchanges seen insupporting system of tooth in increased ordecreased function load • Define Attached gingiva,free gingiva, gingivalsulcus, junctionalepithelium, sulcularepithelium,dentogingival junction,Col SKILLS • Identify in images/patients gingiva, freegingiva, attached • gingiva, col, interdentalgingiva • Identify inimages/histologicalslides, draw and label,and also describe thelocation,direction/orientation,origin, insertion andfunction of principalfibers of gingivalligament • Identify in images/histological slides, draw and label, and also describe the location, direction/orientation, origin, insertion and function of principal fibers of periodontal ligament		
Bone	Relate the developmental	KNOWLEDGE • Define bone , alveolarbone, alveolar process,lamina	Lectures □ SGD	MCQ □ Viva

	and histomorphological knowledge of bone to different clinical scenarios	dura, sharpey'sfibres, bundle bone,Supporting bone,cortical bone, spongybone, interdental bone,inter radicular bone,periosteum, endosteum,osteon, haversian canal,volkman's canal,circumferentiallamellae, concentriclamellae, interstitiallamellae • Classify boneaccording to grossappearance anddevelopment • Discuss histology of compact and spongy bone in terms of • formative and resorptivecells(osteoblasts,osteocytes,osteoclasts), lamellae,Haversian andvolkman's canals • Describe histology andfunction of osteoblast,osteocyte andosteoclasts • Describe histological changesand features of intramembranous andintracartilaginousossification • Describe composition,function, regulation,remodeling (phases,normal turnover rate incortical and trabecularbone, turnover rate inchildren /adults/old age)and age changes andrepair and regenerationof bone SKILLS • Draw and label compactbone histology, • Identify histological changes and features of intramembranous and intracartilaginous ossification • Identify in histological slides/images compact and spongy bone and bone cells		□ OSPE

Tooth Morphology & Physiology Module 2 (6 weeks)				
Tooth eruption & shedding	To understand the process of eruption and shedding and correlate it clinically	KNOWLEDGE • Discuss mechanism andfactors responsible foreruptive tooth movement. • Describe the three typesof movement a toothmakes post eruption tomaintain its functionalposition in the jaw interms of mechanism andsignificance • Discuss histology andcauses of tooth shedding • Enlist local and systemiccauses of premature anddelayed eruption of teeth • Differentiate the three types of physiological tooth movements (preeruptive,eruptive and post eruptive) SKILLS • Identify in images/slide. • draw and labelGaubernacularcord canal, natal teeth, neonatal teeth	Lectures □ SGD	MCQ □ Viva □ OSPE
Permanent Incisors	Demonstrate and compare anatomical structures of central and lateral incisor	KNOWLEDGE • Tabulate initiation of calcification,completion of enamel and root interms of months/years • Discussthe general considerationsincluding tooth surfaces, shapeof mesial, distal, labial, lingualand incisal outlines, mesiodistaldimensions and contours,inclination of incisal margin. SKILLS • Identify, on models/images/teeth specimen, the general considerations include tooth surfaces, the shape of mesial, distal, labial, lingual and incisal	Lectures □ SGD	MCQ □ Viva □ OSPE

		outlines, mesiodistal dimensions and contours, inclination of incisal margin		
Permanent Canines	Demonstrate basic anatomy and anomalies of canines and differentiate it from the rest of the	KNOWLEDGE • Tabulate initiation ofcalcification, completionof enamel and root interms of months/years • Describe and identify, on models/images/teethspecimen, the generalconsiderations includingtooth surfaces, shape • of mesial, distal, labial,lingual and incisaloutlines, mesiodistal • dimensions andcontours, length andinclination ofmesioincisal anddistoincisal slope, shapeand curvature of cervicalmargin, location, andextent of lingual andbuccal ridges, number • and location ofdevelopmentaldepressions, locationand boundaries oflingual fossae, location shape and inclination ofcingulum, marginalridges, height ofcontour, contact area • Describe number,shape, inclination andvariation of root • Describe number,location and significance of pulp canals and pulphorns • Differentiate, onmorphological basis,mandibular andmaxillary canine, canineand incisors SKILLS • Draw and label caninesfrom labial, lingual,mesial, distal andocclusal aspect		
Maxillary premolars	Differentiate between maxillary	KNOWLEDGE • Tabulate initiation ofcalcification, completionof	Lectures □ SGD	MCQ □ Viva

	and mandibular premolar	enamel and root interms of months/years • Describe and identify, onmodels/images/teethspecimen, toothsurfaces, shape ofmesial, distal, buccal,lingual/palatal andocclusal outlines,mesiodistal dimensionsand contours, shape andcurvature of cervicalmargin, boundaries ofocclusal table; numberlocation, size, variation(U, H and Y typeocclusal morphology in case of mandibular2nd premolar) ofcusps, name, number and location of pits,grooves and fossae,boundaries of fossae,location, size,variations of marginalridges, height ofcontour, contact area,mesial concavity,developmentaldepressions, locationand formation oftransverse ridge,location and names ofcusp ridges and inclinedplanes, • Describe number,shape, inclination andvariations of root/roots • Describe number,location and significanceof pulp canals and pulphorns • Differentiate, onmorphological basis,mandibular and maxillary premolars SKILLS • □ Draw and labelpremolars from buccal,lingual/palatal, mesial,distal and occlusal aspect		□ OSPE

Permanent molars	Demonstrate basic anatomy and anomalies of molars and differentiate it from the rest of the dentition.	Tabulate initiation ofcalcification, completionof enamel and root interms of months/years Describe and identify, onmodels/images/teethspecimen, tooth surfaces, shape ofmesial, distal, buccal,lingual/palatal and occlusal outlines,mesiodistal andbuccolingual dimensions and contours, shape andcurvature of cervicalmargin; boundaries ofocclusal table, number,location, size, variationof cusps; name, numberand location of pits,grooves and fossae,boundaries of fossae,location, size, location ofmarginal ridges, height of contour, contactarea, mesialconcavity,developmental depressions, location	Lectures SGD	MCQ/ SEQ Viva OSPE
		and formation oftransverse ridge,location and formation of oblique ridge in case ofmaxillary molars,location and names ofcusp ridges and inclinedplanes Describe number,shape, inclination andvariations of root/roots Describe number,location and significanceof pulp canals and pulphorns Differentiate, onmorphological basis,mandibular and maxillary molars, firstand second molars ofthe same arch, molarsand other permanentteeth Draw and label first,second and third molarsfrom buccal, lingual/palatal, mesial,distal and occlusalaspect		

Morphology of individual deciduous teeth	Discuss the basic anatomy of deciduous dentition and differentiate it from the permanent dentition	Tabulate general morphologicaldifferences between permanent and deciduousteeth. b) Illustrate the morphologicalfeatures of the crown of each tooth from all aspects withrespect to shape, boundaries, dimensions, elevations, anddepressions. c) Discuss number, shape,inclination of root/roots in each tooth. d) Discuss the number, location, and significance of pulp canals in each tooth. **Skills:** • Identify every single tooth in pictures / images based on morphological features. • Draw labelled diagrams of the morphological features of each • tooth from all aspects and sections of crown and root.		

ORAL BIOLOGY 2024

STUDY GUIDE BLOCK II

30.05.24 - 08.09.24 (10 weeks for Academics)

Summer vacations (17.4.24 -7.7.24)

Week -1		
Periodontal ligament	LGIS	Dr.Saman
Cells of Periodontal ligament	LGIS	Dr.Omair
Periodontal ligament, age ,blood and nerve supply	LGIS	Dr.Omair
Graphical representation of permanent Anteriors	LGIS	Dr.Kiran
Draw the microstructure and histologicalfeaturesof PDL • PDL	SGD	Dr.omair
Maxillary Permanentanterior: Identification & Comparison on models Draw and label graphically	Practical	Dr.Kiran
Week -2		
Permanent Incisors	LGIS	Dr.Saman
PDL histology	LGIS	Dr.Omair
Graphical representation of permanent canine	LGIS	Dr.Kiran
Differences between deciduous and permanent incisor	LGIS	Dr.Kiran
Draw the histological features of PDL	SGD	Dr.Omair
Mandibular Permanent anterior: Draw and label graphically	practical	Dr.Kiran

Week-3		
Graphical representation of Incisors	LGIS	Dr.Kiran
Shedding of deciduous teeth	LGIS	Dr.Omair
Permanent Maxillary Canine	LGIS	Dr.Kiran
Shedding of deciduous teeth	LGIS	Dr.Omair
Permanent canine: Identification & Comparison on models	Practical	Dr.Kiran
Gubernacular cords	SGD	Dr.Omair
Week-4		
canines	LGIS	Dr.saman
Shedding of teeth	LGIS	Dr.Omair
Clinical implications of PdL	LGIS	Dr.Kiran
Comparision of permanent and deciduous anteriors	LGIS	Dr.Kiran
Identify cementum slides of ground section of tooth. Identify the various types of Cementum in histological slides.	practical	Dr.Omair
Revision Permanent Maxillary canine: Identification & Comparison on models Draw and label graphically	practical	Dr.Kiran
Week-5		
Deciduous canine	LGIS	Dr.Kiran
Shedding of deciduous teeth	LGIS	Dr.Omair
Permanent canine	LGIS	Dr.Kiran

Physiological tooth movement	LGIS	Dr.KIran
Formative Assesment of summer vacations tasks	Practical	Dr.Kiran
Week-6		
Types of CEJ	LGIS	Dr.Kiran
Shedding of teeth	LGIS	Dr.Omair
Mandibular Canine	LGIS	Dr.Kiran
Clinical implications of cementum	LGIS	Dr.Kiran
Draw &Classifycemento-enamel junction	practical	Dr.Omair
Maxillary 1st pre molar Formative Assessment of summer vacations tasks Identification & comparison on models	practical	Dr.Kiran
Week-7		
Types of cementum	LGIS	Dr.saman
premolar	LGIS	Dr. Kiran
Maxillary 1st premolar	LGIS	Dr. Kiran
Development of dentition	LGIS	Dr.Kiran
Identify in histological slides, draw, and label, and describe the location, direction/orientation, origin, insertion and function of Principal fibers of periodontal ligament and gingival ligament.	Practical	Dr.Omair
Maxillary 2nd premolar Identification & comparison on models Draw and label graphically	SGD	Dr.Kiran

Week 8		
Post eruptive tooth movement	LGIS	Dr.Saman
Maxillary 1st premolar	LGIS	Dr.Kiran
Eruptive tooth movement	LGIS	Dr.Saman
Maxillary 2nd premolar	LGIS	Dr.Kiran
Maxillary Premolar Identification & comparison on models Draw and label graphically	Practical	Dr.Kiran
Identify the gingiva, free gingiva, attached gingiva, col, and slides and Study models.	practical	Dr.Omair
Week-9		
Post eruptive tooth movement	LGIS	Dr.Saman
Mandibular 1st Premolar:	LGIS	Dr.Kiran
Mandibular 2nd premolar	LGIS	Dr.Kiran
Introduction to bone	LGIS	Dr.Omair
Premolars	Practical	Dr.Kiran
Draw and label gubernacular canal	SGD	Dr.Omair
Week-10		
Bone remodelling	LGIS	Dr.Kiran
Clinical correlations of bone	LGIS	Dr.Saman
Maxillary permanent molar	LGIS	Dr.Kiran
Mandibular permanent molar	LGIS	Dr.kiran

Mandibular premolar	practical	Dr.kiran

Week-1			
1.	Integrated session with Anatomy Introduction to Respiration and Functions of the Respiratory tract	All department faculty and staff	LGIS
2.	Cough and Sneeze Reflex	Dr. Ayesha Zafar	LGIS
3.	Pulmonary mechanics	Dr. Ayesha Zafar	LGIS
4.	Pulmonary Volumes and Capacities	Dr. Ayesha Zafar	LGIS
5.	Pulmonary compliance and Role of Breathing	Dr. Ayesha Zafar	LGIS
6.	Integrated session with Biochemistry Surfactant	Dr.Ambreen and Dr. Ayesha Zafar	LGIS
7.	Principles of Gas Exchange	Dr.Ayesha Zafar	LGIS
Week-2			
8.	O_2 Transport	Dr.Ayesha Zafar	LGIS
9.	Oxygen hemoglobin dissociation curve-1	Dr.Ayesha Zafar	LGIS
10.	Oxygen hemoglobin dissociation curve-2	Dr.Fatima, Dr.Alina	SGD
11.	CO_2 Transport	Dr.Ayesha Zafar	LGIS
12.	Nervous Regulation of Respiration-1	Dr.Ayesha Zafar	LGIS
Week -3			
13.	Chemical Regulation of Respiration-1	Dr. Ayesha Zafar	LGIS
14.	Chemical Regulation of Respiration-2	Dr. Ayesha Zafar	LGIS
15.	Regulation of Respiration	Dr. Ayesha Zafar/Dr.Aleena/Dr.Fatima	CBL
16.	Hypoxia and Cyanosis	Dr.Aleena	LGIS
Week -4			
17.	Intro to Endocrinology	Dr.Fatima	SGD
18.	Mechanism of action of hormones	Dr. Ayesha Zafar	LGIS
19.	Hypothalamus-1	Dr. Ayesha Zafar	LGIS

20.	Hypothalamus-2	Dr. Ayesha Zafar	SGD
21.	Anterior Pituitary and Growth hormone	Dr. Ayesha Zafar	LGIS
22.	Growth Hormone	Dr.Ayesha	Flip Classroom
Week -5			
23.	Posterior Pituitary (ADH and Oxytocin)	Dr. Ayesha Zafar	LGIS
24.	Integrated session with Anatomy Thyroid-1	Dr. Ayesha Zafar/Dr.Ayesha	LGIS
25.	Thyroid-2	Dr. Ayesha Zafar	LGIS
26.	Pathophysiology of Thyroid Gland	Dr. Ayesha Zafar	LGIS
27.	Graves/Goiter	Dr. Ayesha Zafar/ Dr.Aleena/Dr.Fatima	CBL
28.	Integrated session with Anatomy Parathyroid-1	Dr. Ayesha Zafar/Dr.Ayesha	LGIS
29.	Parathyroid-2	Dr. Ayesha Zafar	LGIS
30.	Abnormalities of PTH	Dr. Ayesha Zafar/ Dr.Aleena/ Dr.Fatima	CBL
Week-6			
31.	Vitamin D	Dr. Ayesha Zafar	LGIS
32.	Calcitonin	Dr. Ayesha Zafar	LGIS
33.	Adrenal cortex + Aldosterone	Dr. Ayesha Zafar	LGIS
34.	Adrenal cortex & Cortisol	Dr. Ayesha Zafar	LGIS
35.	Pathophysiology of Adrenal Gland	Dr. Ayesha Zafar	LGIS
36.	Addison's Disease/Cushings	Dr. Ayesha Zafar/Dr.Aleena/Dr.Fatima	CBL
Week-7			
37.	Pancreas-1	Dr. Ayesha Zafar	LGIS
38.	Pancreas-2	Dr. Ayesha Zafar	LGIS
39.	Integrated session with Anatomy Introduction to optics	Dr. Ayesha Zafar/Dr.Ayesha	LGIS
40.	Errors of Refraction -1	Dr. Ayesha Zafar	LGIS
41.	Errors of Refraction -2	Dr. Ayesha Zafar	LGIS
Week-8			
42.	Integrated session with biochemistry	Dr. Ayesha Zafar	LGIS

	Photochemistry of vision and Retina-1		
43.	Photochemistry of vision and Retina-2	Dr. Ayesha Zafar	LGIS
44.	Visual Pathway-1	Dr. Ayesha Zafar	LGIS
45.	Visual Pathway-2	Dr. Ayesha Zafar	LGIS
46.	Light Reflex Pathway and Accommodation Reflex	Dr. Ayesha Zafar	LGIS
Week-9			
47.	Myopia/Hypermetropia	Dr. Ayesha Zafar	SGD
48.	Integrated session with Anatomy Physiological anatomy of Ear	Dr. Ayesha Zafar/Dr.Ayesha	LGIS
49.	Mechanism of Conduction of sound waves-1	Dr. Ayesha Zafar	LGIS
Week-10			
50.	Mechanism of Conduction of sound waves-2	Dr. Ayesha Zafar	LGIS
51.	Impedance Matching	Dr. Ayesha Zafar	LGIS
52.	Attenuation Reflex	Dr. Ayesha Zafar	LGIS
53.			
54.	Taste	Dr. Ayesha Zafar	LGIS
55.	Smell	Dr. Ayesha Zafar	LGIS

Sr no.	Practical	Facilitator
1.	Examination of radial pulse	Dr. Fatima/Dr.Alina/Mr. Islam and Sohaib
2.	Examination of heart sounds	Dr. Fatima/Dr.Alina/Mr. Islam and Sohaib
3.	Recording of normal ECG	Dr. Fatima/Dr.Alina/Mr. Islam and Sohaib
4.	Recording of BP by palpatory and auscultatory method	Dr. Fatima/Dr.Alina/Mr. Islam and Sohaib
5.	Recording of BP by palpatory and auscultatory method	Dr. Fatima/Dr.Alina/Mr. Islam and Sohaib
6.	Effect of Posture and Exercise on BP	Dr. Fatima/Dr.Alina/Mr. Islam and Sohaib
7.	Revision	Dr. Fatima/Dr.Alina/Mr. Islam and Sohaib
8.	Revision	Dr. Fatima/Dr.Alina/Mr. Islam and Sohaib
9.	Revision	Dr. Fatima/Dr.Alina/Mr. Islam and Sohaib

Weekly lecture distribution

Sr. No	Topics	Sub-Discipline	MITs	Instructor
		WEEK-1		
1.	Development of skull-I	Embryology	LGIS	Dr Aisha Shahid
2.	Development of skull-II	Embryology	LGIS	Dr Aisha Shahid
3.	Development of skull-III	Embryology	LGIS	Dr Aisha Shahid
4.	Skull –I	Gross anatomy	SGD	Dr Amna , Dr Marrium
5.	Skull –II	Gross anatomy	SGD	DrAmna, Dr Marrium
6.	Skull –III	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Revision	Gross anatomy	Practical/SGD	Dr Amna ,DrMarrium
		WEEK-2		
1.	Face	Gross anatomy	LGIS	Dr Aisha Shahid
2.	Nose	Gross anatomy	LGIS	Dr Aisha Shahid
3.	Paranasal sinuses	Gross anatomy	LGIS	Dr Aisha Shahid
4.	Scalp	Gross anatomy	SGD	Dr Amna ,DrMarrium
5.	Arteries of face	Gross anatomy	SGD	Dr Amna ,DrMarrium

6.	Veins of face	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Face (models)	Gross anatomy	Practical/SGD	Dr Amna ,DrMarrium
WEEK-3				
1.	Parotid region -I	Gross anatomy	LGIS	Dr Aisha Shahid
2.	Parotid region -II	Gross anatomy	LGIS	Dr Aisha Shahid
3.	Temporal and infratemporal region	Gross anatomy	LGIS	Dr Aisha Shahid
4.	Temporomandibular joint-I	Gross anatomy	SGD	Dr Amna ,DrMarrium
5.	Muscles of mastication	Gross anatomy	SGD	Dr Amna ,DrMarrium
6.	Temporomandibular joint -II	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Mandible	Gross anatomy	Practical/SGD	Dr Amna ,DrMarrium
WEEK-4				
1.	Submandibular region	Gross anatomy	LGIS	Dr Aisha Shahid
2.	Thyroid and parathyroid gland	Gross anatomy	LGIS	Dr Aisha Shahid
3.	Pharynx -I	Gross anatomy	LGIS	Dr Aisha Shahid
4.	Hard and soft palate	Gross anatomy	SGD	Dr Amna ,DrMarrium

5.	Supra and infrahyoid muscles	Gross anatomy	SGD	Dr Amna ,DrMarrium
6.	Oral cavity	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Models (revision)	Gross anatomy	Practical/SGD	Dr Amna ,DrMarrium
WEEK-5				
1.	Pharynx -II	Gross anatomy	LGIS	Dr Aisha Shahid
2.	Tongue	Gross anatomy	LGIS	Dr Aisha Shahid
3.	Triangles of the neck	Gross anatomy	LGIS	Dr Aisha Shahid
4.	Viscera of neck	Gross anatomy	SGD	Dr Amna ,DrMarrium
5.	Arteries of the neck	Gross anatomy	SGD	Dr Amna ,DrMarrium
6.	Veins of the neck	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Tonsils	Gross anatomy	Practical/SGD	Dr Amna ,DrMarrium
WEEK-6				
1.	Larynx -I	Gross anatomy	LGIS	Dr Aisha Shahid
2.	Larynx -II	Gross anatomy	LGIS	Dr Aisha Shahid
3.	Larynx (nerve supply n clinical correlates)	Gross anatomy	LGIS	Dr Aisha Shahid
4.	Muscles of neck	Gross anatomy	SGD	Dr Amna ,DrMarrium

5.	Back of neck	Gross anatomy	SGD	Dr Amna ,DrMarrium
6.	Joints of neck	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Cervical vertebrae	Gross anatomy	Practical/SGD	Dr Amna ,DrMarrium
WEEK-7				
1.	Eye	Gross anatomy	LGIS	Dr Aisha Shahid
2.	Ear -I	Gross anatomy	LGIS	Dr Aisha Shahid
3.	Ear-II	Gross anatomy	LGIS	Dr Aisha Shahid
4.	Prevertebral region	Gross anatomy	SGD	Dr Amna ,DrMarrium
5.	Orbit	Gross anatomy	SGD	Dr Amna ,DrMarrium
6.	Lacrimal apparatus	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Revision (models)	Gross anatomy	Practical/SGD	Dr Amna ,DrMarrium
WEEK-8				
1.	Deep cervical fascia –I	Gross anatomy	LGIS	Dr Aisha Shahid
2.	Deep cervical fascia –II	Gross anatomy	LGIS	Dr Aisha Shahid
3.	Facial nerve-I	Gross anatomy	LGIS	Dr Aisha Shahid
4.	Ptergopalatine fossa -I	Gross anatomy	SGD	Dr Amna ,DrMarrium
5.	Ptergopalatine fossa -Ii	Gross anatomy	SGD	Dr Amna ,DrMarrium
6.	Maxillary artery	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Surface marking	Gross anatomy	Practical/SGD	Dr Amna ,DrMarrium

WEEK-9				
1.	Facial nerve-II	Gross anatomy	LGIS	Dr Aisha Shahid
2.	Parasympathetic ganglion-I	Gross anatomy	LGIS	Dr Aisha Shahid
3.	Parasympathetic ganglion-II	Gross anatomy	LGIS	Dr Aisha Shahid
4.	Trigeminal nerve -I	Gross anatomy	SGD	Dr Amna ,DrMarrium
5.	Trigeminal nerve -II	Gross anatomy	SGD	Dr Amna ,DrMarrium
6.	Ansa cervicalis	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Surface marking	Gross anatomy	Practical/SGD	Dr Amna ,DrMarrium
Week- 10				
1.	Cervical plexus	Gross anatomy	LGIS	Dr Aisha Shahid
2.	Revision	Gross anatomy	LGIS	Dr Aisha Shahid
3.	Revision	Gross anatomy	LGIS	Dr Aisha Shahid
4.	Revisit to Lymphatics of head n neck	Gross anatomy	SGD	Dr Amna ,DrMarrium
5.	Revision	Gross anatomy	SGD	Dr Amna ,DrMarrium
6.	Revision	Gross anatomy	SGD	Dr Amna ,DrMarrium
7.	Radiographs	Gross anatomy	SGD/practical	Dr Amna, Dr Marrium

BIOCHEMISTRY

WEEKLY LECTURE PLAN

Week 01			
Sr.no	**Topic**	**MIT**	**Facilitator**
1.	Chemistry and structure of nucleotides	LGIS	Dr.NailaZikria
2.	Biochemical role of nucleotides	LGIS	Dr. Ambreen Gul
3.	Eicosanoids introduction	LGIS	Dr. Rabbia Shabbir
4.	Prostaglandins and leukotrines	LGIS	Dr.Rabbia Shabbir
5.	Integrated session with Physiology Surfactant	LGIS	Dr. Ambreen Gul Dr. Aisha Zafar
6.	Preparation of solutions	Practical	Dr.NailaZikria
Week 02			
7.	Amino acids classification	LGIS	Dr.Ambreen Gul
8.	Organization of proteins	LGIS	Dr. Ambreen Gul
9.	Misfolding of proteins	LGIS	Dr. Rabbia Shabbir
10.	Fibrous proteins	LGIS	Dr.Ambreen Gul
11.	Elastin	LGIS	Dr.Ambreen Gul

12.	Color reactions of protein : Biuret test	Practical	Dr. Rabbia Shabbir
Week 03			
13.	Biochemistry of body fluids –I	LGIS	Dr. Naila Zikria
14.	Biochemistry of body fluids –I	LGIS	Dr. Naila Zikria
15.	Osmosis, viscosity and surface tension	LGIS	Dr. Naila Zikria
Week 04			
16.	Amino acid pool	LGIS	Dr.Rabbia Shabbir
17.	Transamination	LGIS	Dr.Rabbia Shabbir
18.	Deamination	LGIS	Dr.Ambreen Gul
19.	Transport of Ammonia		Dr.Ambreen Gul
20.	Urea cycle		Dr.Rabbia Shabbir
21.	Color reactions of protein I , Ninhydrin test	Practicle	Dr. Naila Zikria
Week 05			
22.	Ammonia Intoxication	LGIS	Dr.Ambreen Gul
23.	Phospholipids , chemistry and structure	LGIS	Dr. Rabbia Shabbir
24.	Phospholipids clinical significance	LGIS	Dr. Rabbia
25.	CBL		All Faculty
26.	Xanthoproteic test	Practical	Dr. Rabbia Shabbir
Week 06			

27.	Class test		All Faculty
28.	Carcinogenesis , biomedical importance	LGIS	Dr. Ambreen Gul
29.	Oncogenes and tumor suppressor genes	LGIS	Dr.Ambreen Gul
30.	Tumor biomarkers	LGIS	Dr .Ambreen Gul
31.	Reactive oxygen species /Mechanism of production of ROS	LGIS	Dr .Ambreen Gul
32.	Aldehyde test	Practical	Dr. Naila Zikria
Week 07			
33.	Effect of ROS on health and disease	LGIS	Dr. Naila Zikria
34.	Mechanism of scavenging of ROS	LGIS	Dr. Ambreen
35.	Biochemical role of antioxidant	LGIS	Dr. Naila Zikria
36.	Respiratory proteins	Flip-classroom	Dr. Rabbia Shabbir
37.	Millon Nasse Test	Practical	Dr. Rabbia Shabbir
Week 08			
38.	Buffers	LGIS	Dr.Naila
39.	SGD	LGIS	Dr. Rabbia and Dr.Naila
40.	Integrated session with Physiology Vitamin A (Photochemistry of vision and Retina-1)	LGIS	Dr. Naila Dr. Aisha Zafar
41.	Vitamin E	LGIS	Dr. Naila

42.	Sulphur Test	Practical	Dr. Rabbia
Week 09			
43.	Lipoic acid , Coenzyme Q	LGIS	Dr.Rabbia
44.	NADPH and Glutathione	LGIS	Dr.Rabbia
45.	Vitamin D	LGIS	Dr.Naila
46.	Vitamin D deficiency disorders	LGIS	Dr.Naila
47.	Vitamin C	LGIS	Dr. Rabbia
48.	Revision of practicals	Practical	Dr.Naila
Week 10			
49.	Vitamin K	LGIS	Dr.Naila
50.	Vitamin K	LGIS	Dr.Naila
51.	Revision of practicals	Practical	Dr,Rabbia

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

Learning Resources:

a. BIOCHEMISTRY

1. Lippincott's illustrated reviews, 7th edition
2. Harper's illustrated Biochemistry, 30th edition
3. M.N Chatterjea Textbook of Biochemistry, 8th edition
4. Biochemistry by Mushtaq Vol I and II
5. Practical Biochemistry Manual (Prof Maj Gen AK Naveed, Dr Shakir Khan)
6. Electronic modes

b. PHYSIOLOGY

c. 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 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)	
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.

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