University of Health Sciences
Lahore

BDS Integrated Curriculum 2K25

Version 01


بسم الله الرحمن الرحيم

BDS Integrated Curriculum 2K25

version 01

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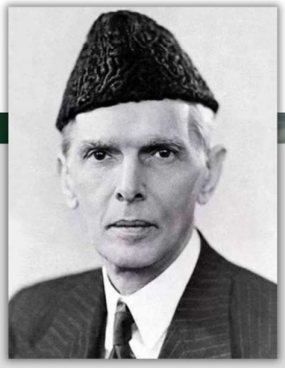
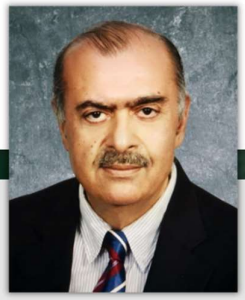


Without education it is complete darkness and with education it is light. Education is a matter of life and death to our nation. The world is moving so fast that if you do not educate yourselves, you will be not only completely left behind, but will be finished up.

Quaid e Azam Muhammad Ali Jinnah
Islamia College Lahore 1945



I am pleased to introduce our newly developed curriculum document, which embodies our commitment to providing quality education in dental undergrate program. This revamped curriculum is designed to foster a holistic learning experience, emphasizing community services, and adhering to international standards.

The new curriculum boasts an innovative integration of subjects, ensuring a seamless transition from theoretical foundations to practical applications. Our clerkship model provides students with hands-on experience, bridging the gap between academia and real-world practice.

As we continue to attract overseas students, our curriculum has been tailored to accommodate diverse learning needs, while maintaining the highest standards of dental education. Our competency-based approach ensures that graduates possess the requisite skills, knowledge, and attitudes to excel in their chosen careers.

This milestone achievement would not have been possible without the tireless efforts of our faculty, subject experts, Department of Medical Education . I extend my sincerest gratitude to everyone involved in this endeavor.

Together, let us embark on this exciting journey of 2K25 Dental Education.

Prof. Ahsan Waheed Rathore
Vice Chancellor
University of Health Sciences Lahore

It is a great pleasure for me that UHS announce the launch of our newly designed, integrated dental undergraduate curriculum. This milestone marks a significant shift in our approach to dental education, as we strive to provide our students with a comprehensive, holistic learning experience.

This curriculum incorporates the latest dental updates, ensuring that our students are equipped with cutting-edge knowledge and skills. We have undertaken a total revision of our traditional curriculum, which had not been updated for some time. This overhaul has enabled us to review some outdated content, streamline our courses, and foster a more cohesive learning environment.

At the heart of our new curriculum lies a focus on student training as future leaders. We recognize that our students are not just future dental professionals, but also individuals with unique needs, aspirations, and learning styles. Our integrated curriculum is designed to nurture the whole student, encompassing academic rigor, clinical excellence, and personal growth.

This innovative curriculum would not have been possible without the collaborative efforts of our esteemed faculty, Medical Education Department ,staff, and subject experts. I extend my sincerest appreciation to everyone involved in this endeavor.

Prof. Dr. Nadia Naseem
Pro Vice Cahncellor
University of Health Sciences Lahore

I am thrilled at the launch of our newly designed BDS curriculum, marking a significant milestone in our pursuit of excellence in dental education. This achievement would not have been possible without the tireless efforts of our working groups, module coordinators, steering committee members, and department teams. I extend my sincerest gratitude to each and every one of for their dedication and hard work.

Our new curriculum is designed to empower our young dental doctors to explore new horizons, where the sky's the limit. We aim to nurture professionals who will not only serve our local community but also make a positive impact globally. By striving for higher education and embracing cutting-edge technology, including AI-supported health facilities, we are committed to meeting the future needs of our students and the healthcare industry.

We are dedicated to regularly reviewing and updating our curricular document to ensure it remains relevant, effective, and aligned with the latest developments in dental education. I am proud to execute the vision of our Vice Chancellor, and I would like to thank his office for their unwavering support throughout this journey.

Together, let us embark on this exciting new chapter in our pursuit of excellence in dental education.

Prof. Dr. Sumera Ehsan
HOD Medical Education
University of Health Sciences Lahore

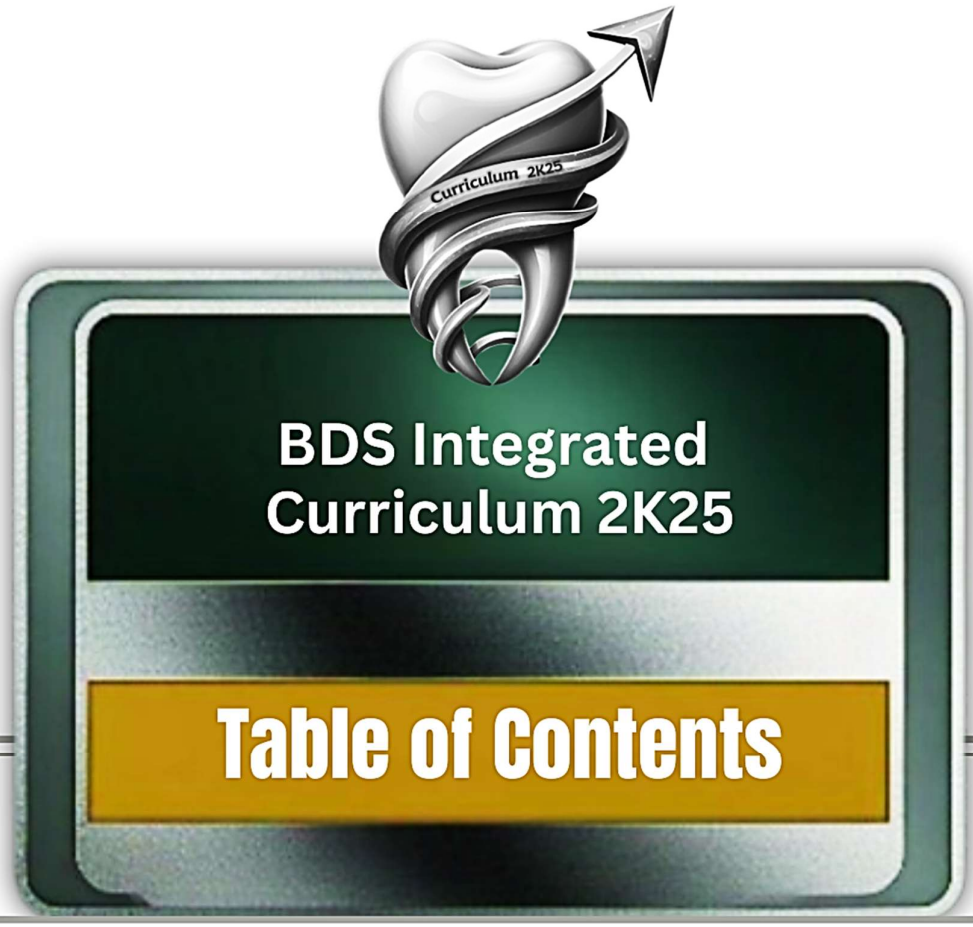
University of Health Sciences
Lahore

Vision Statement

UHS is a leading University aiming to keep its graduates apt with the ever emerging global health challenges evolving educational methodologies and emerging technological advancements to maintain its distinguishable position as a Medical University.

Mission Statement

UHS shall continue to strive for producing a human resource par at excellence to cater for the health needs of the people of Punjab and Pakistan.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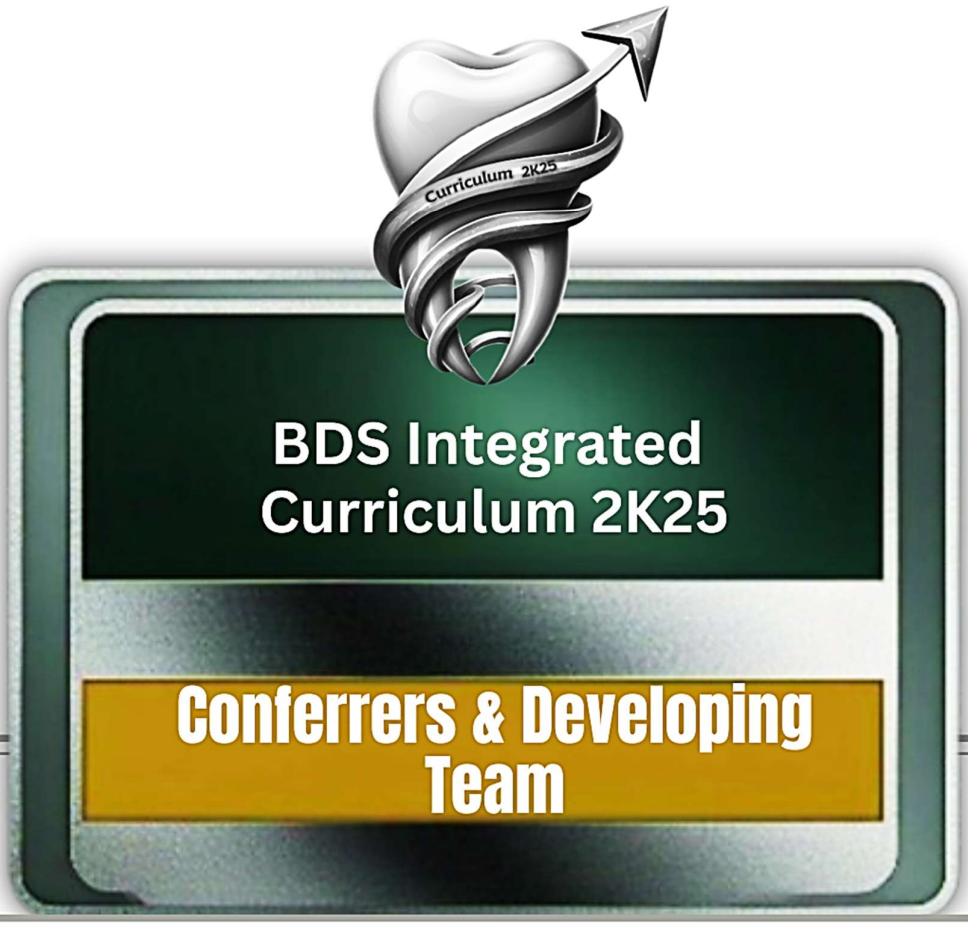
Curriculum 2K25
BDS Integrated
Curriculum 2K25
Conferrers & Developing
Team

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5	**Dr. Alina Saeed** Assistant Professor Department of Medical Education Lahore Medical & Dental College	**Module 5:** **Neurosciences**
6	**Prof. Dr Afifa Ehsan** Professor & Head, Department of Oral Biology, Director Medical Education Department, Faryal Dental College, Lahore	**Module 6:** **Alveo-Cemental Complex**
7	**Dr Muhammad Imtiaz** Assistant Professor Oral and maxillofacial surgery, FMH College of Medicine and Dentistry, Lahore	**Module 7:** **Blood & Cardiovascular System**
8	**Dr. Saman Fatima** Assistant Professor Medical Education College of Dentistry, Bakhtawar Amin Medical & Dental College, Multan	**Module 8:** **Gastrointestinal Tract**
9	**Prof. Dr Afifa Ehsan** Professor & Head, Department of Oral Biology, Faryal Dental College, Lahore	**Module 9:** **Occlusion-I**
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2	Professor Sarah Ghafoor
3	Professor Saad Mateen
4	Dr. Saqib Rabbani
5	Dr. Salima Naveed Manji
6	Dr. Farah Rehman
7	Ms. Shehla Noor
8	Dr Rameen

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Creative Designer BDS Integrated Curriculum *Version 01*	
1	Ms. Shehla Noor

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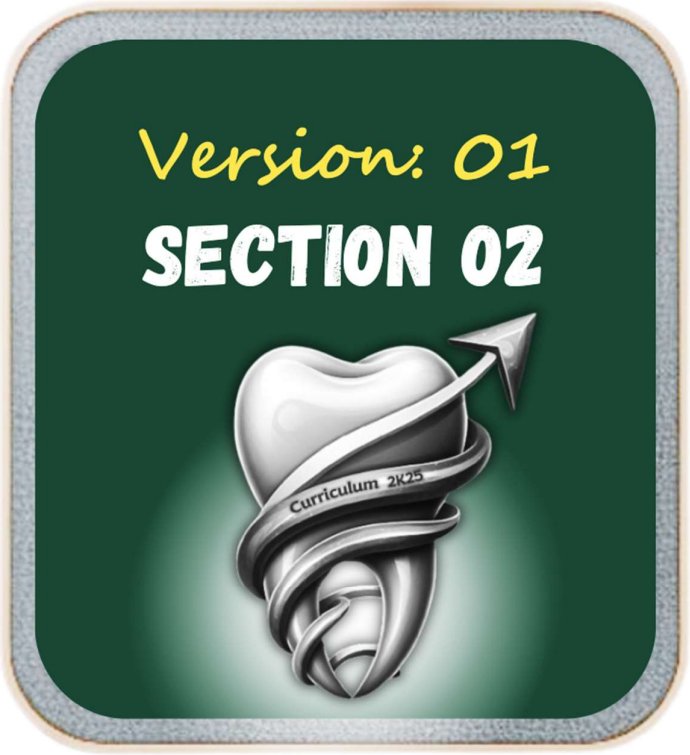

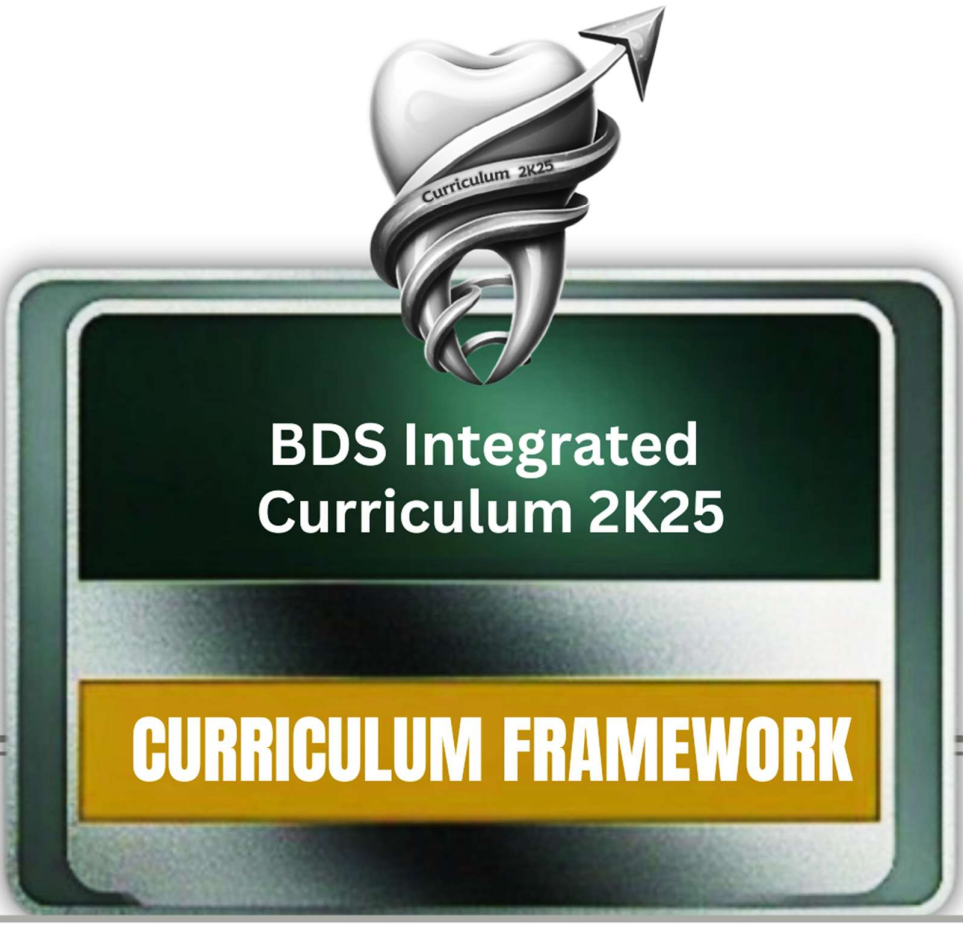
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CURRICULUM FRAMEWORK

CURRICULUM FRAMEWORK

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YEAR-1 MODULES

Block-1

1. Foundation (Cell)
2. Craniofacial-I
3. Cariology-I

Block-2

4. Craniofacial-II
5. Neurosciences
6. Alveo-Cemental Complex

Block-3

7. Blood & Cardiovascular System
8. Gastrointestinal Tract
9. Occlusion-I

PRISME

Professionalism, Research, Informatics (Dental), Social Responsibility, Management/Entrepreneurship and Evidence Based Dentistry)

Islamiyat/Civics & Pakistan Studies

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SECTION 03

University of Health Sciences Lahore

FOREWORD

BDS Integrated Curriculum 2K25

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BDS Integrated Curriculum 2K25

Version 01

The University of Health sciences, keeping up with the continuing changes in the world and keeping par with the international standards, introduced the modular integrated curriculum 2k23 in 2023. This curriculum changed the outlook of medical teaching and training in medical colleges across the Punjab. To achieve the aim of producing a quality dental graduate having generic competencies of being knowledgeable in basic clinical sciences and skillful in clinical sciences, through professional, leader and role model, the University has now launched the BDS modular integrated curriculum 2K25 for students of Bachelor of Dental Surgery (BDS)

The concept and process of development of 2K25 BDS integrated Curriculum is based on principles of Kern Cycle for curriculum development.

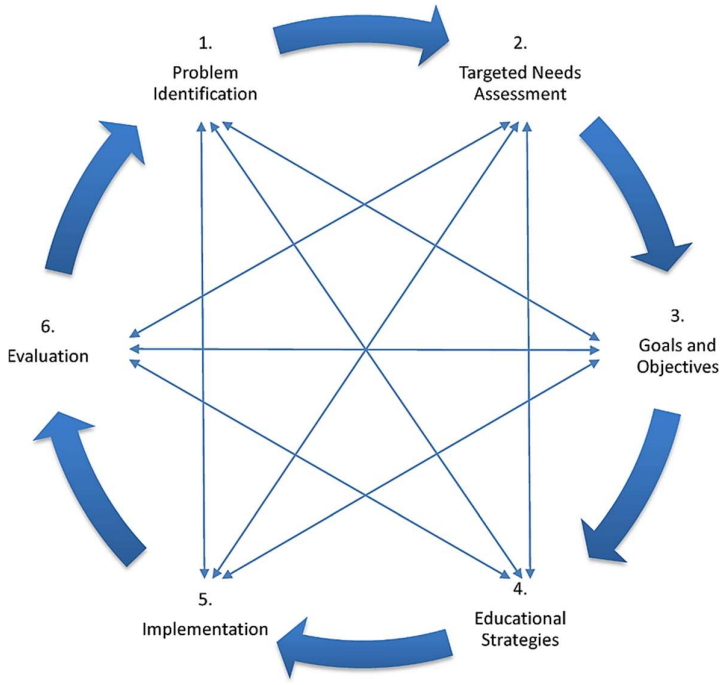


Figure. 1

Kern's Cycle of Medical Curriculum Development

The purpose of BDS integrated 2K25 curriculum is based on the foundations of building clinical knowledge and skill learning where students will think as clinicians from the first day of entry in the dental college. The modular curriculum includes both the horizontal and vertical integration approach. The vertical integration approach involves placing basic dental sciences learning in context of clinical and

entrepreneurial practice, thus broadening the ways for instructional strategies for teachers and students to learn dentistry. Revisiting essential concepts in various phases of learning across the years reinforces the fundamental knowledge with clinical correlations and patients increase conceptual building and clarity.

Need for Development of a Modular Integrated Curriculum

Contextualization in the curriculum refers to the process of integrating the pertinent local needs of the population and global standards into the curriculum. It ensures that the curriculum is relevant to the needs of the local community, while also meeting the global standards. In the context of health professionals, contextualization is essential as it helps students to be better prepared for the practical world, where they will be providing healthcare services to diverse populations.

In Pakistan, traditional discipline-based curriculum had been followed for many decades now, which was spread over 4 years of didactic teaching and clinical trainings, whereas now the need of clinical conceptualization is essential to understand the unique healthcare teaching and clinical challenges that may include faculty development, infrastructure needs, clinical exposure for the students, increase disease burden of oral diseases including cancer, poor management of the dental patients, lack of training of students in forensic dentistry, limited resources for dentistry in hospitals etc. Thus, necessitating a unique tailored approach to dental education and integration.

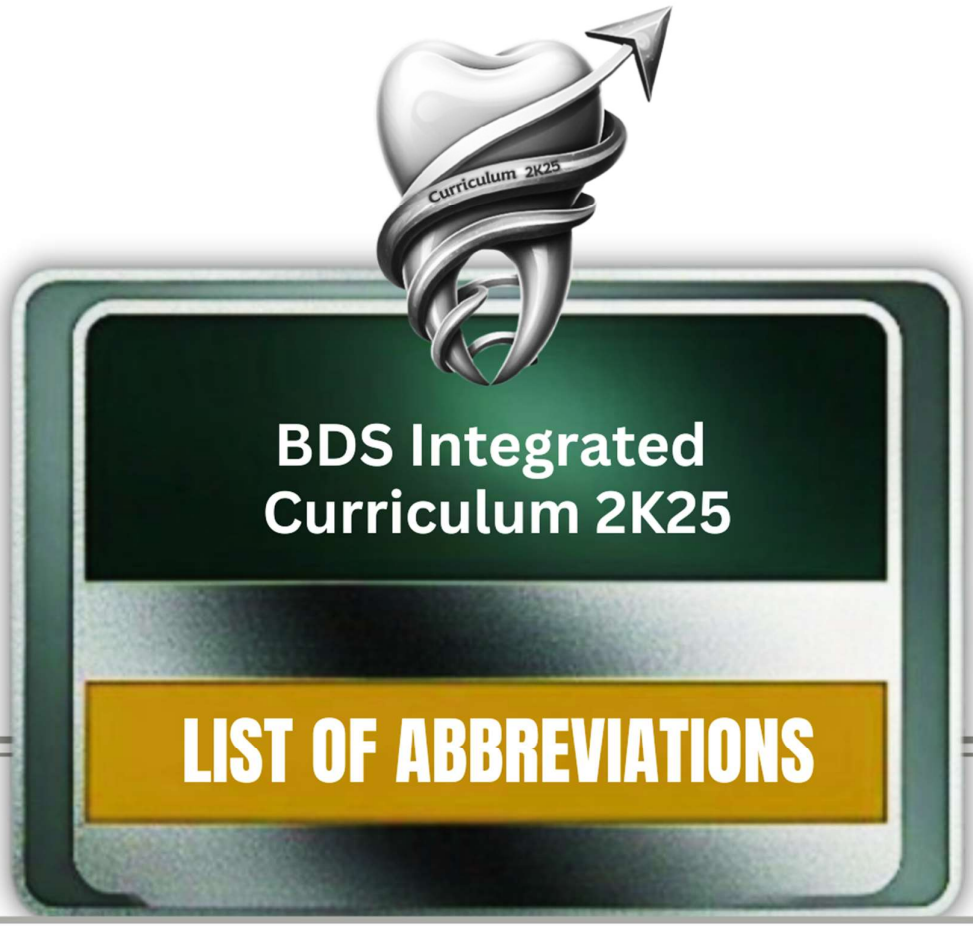
Uniqueness of Modular Integrated Curriculum 2K25

The modular integrated curriculum 2K25 is uniquely designed to cater with the clinical needs of the students in an integrated manner.

1. **Spiral Integration of the Modules**
   The curriculum has three spiral integrations of subjects present throughout it. One spiral integration of basic and clinical correlation will be done in 1st and 2nd year. The second spiral integration will be in 3rd and 4th year. The spiral of PRISME will be integrated throughout all the years of study.
2. Inclusion of pre-hospital emergency based clinical training workshops for the students
3. Structured logbooks
4. Structured internal assessment
5. Inculcation of Forensic odontology in the curriculum
6. Teaching Pediatric dentistry
7. Correlation of dental radiology with clinical cases
8. Entrepreneurship/ practice management

9. Training using AI in Dentistry for clinical assessment
10. CIPP model (Context, Input, Process, Product) for continuous evaluation of curriculum for quality control purposes

The BDS Integrated Curriculum 2k25 will serve as a landmark educational design for teaching, learning, assessment and trainings of all BDS students and will serve as an educational experience for all faculty and students to improvement of dentistry throughout Pakistan.


Curriculum 2K25
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Curriculum 2K25
LIST OF ABBREVIATIONS

LIST OF ABBREVIATIONS

Abbreviations	Subjects
UHS	University of Health Sciences
BDS	Bachelor of Dental Surgery
PRISME	Professionalism, Research, Informatics, Social Responsibility, Management & Entrepreneurship, Ethics
WHO	World Health Organization
A	Anatomy
B	Biochemistry
Ph	Pharmacology
P	Physiology
Pa	Pathology
OB	Oral Biology
OP	Oral Pathology
CD	Community Dentistry
OD	Operative Dentistry
BhS	Behavioral Sciences
CNS	Central Nervous System
GIT	Gastrointestinal Tract
CVS	Cardiovascular System
TMJ	Temporomandibular Joint
CBC	Complete Blood Count
ESR	Erythrocyte Sedimentation Rate
PCR	Polymerase Chain Reaction
ED50	Median Effective Dose
LD50	Median Lethal Dose
TD50	Median Toxic Dose
AUC	Area Under Curve
MCV	Mean Corpuscular Volume
MCH	Mean Corpuscular Hemoglobin
MCHC	Mean Corpuscular Hemoglobin Concentration
Na	Sodium
K	Potassium
DNA	Deoxyribonucleic Acid
TORCH	Toxoplasmosis, Other, Rubella, Cytomegalovirus, Herpes simplex

CF	Craniofacial
CFII	Craniofacial II
Car	Cariology
DEJ	Dentin enamel Junction
HERS	Hertwig's Epithelial Root Sheath
FDI	Fédération Dentaire Internationale
GAGs	Glycosaminoglycans
EFA	Essential Fatty Acids
Hb	Hemoglobin
HbA1c	Glycated Hemoglobin
ATP	Adenosine Triphosphate
RBC	Red Blood Cell
NMJ	Neuromuscular Junction
ID50	Median Infectious Dose

BDS Integrated Curriculum 2K25

Time Allocation and Academic Framework

The First Professional BDS academic year consists of a minimum of 1,200 teaching hours, conducted in affiliated colleges. The curriculum is structured into three blocks, each further divided into modules with defined learning outcomes for each subject.

Blocks	Block 1	Block 2	Block 3
Modules	Foundation	Craniofacial II	Blood and CVS
	Craniofacial I	Neurosciences	GIT
	Cariology I	Alveolocemental Complex	Occlusion I
	PRISME (Professionalism, Research, Informatics (Dental), Social Responsibility, Management/Entrepreneurship and Ethics)		
	Islamiyat / Civics and Pakistan studies		

Weekly Academic Commitment

Students are required to participate in **35 hours per week** of **teaching, learning, and assessments**. Beyond these scheduled academic hours, they are expected to invest additional time in **self-study and independent learning.**

BDS Integrated Curriculum 2K25

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BLOCK 01

YEAR-01

Module No. 01

FOUNDATION

MODULE RATIONALE

The dental students need to master competencies that align their knowledge and skills, and prepare them for the dynamics of their profession. The foundation module lays the groundwork on which the integrated dental curriculum stands strong to uphold the sound practices of the dental profession. The foundation module has been designed to introduce the dental students to the concepts of dentistry and explain the molecular, genetic, anatomical, physiological and pathological mechanisms essential for body functions. Cell is the structural and functional unit of life and this module. Using a constructivist approach this module gives an orientation to the dental students on which they are prepared for the upcoming modules.

MODULE OUTCOMES

- Classify human dentition.
- Identify and describe the anatomical landmarks of tooth using models and diagrams.
- Interpret different tooth numbering systems.
- Describe the structure and function of cellular organelles.
- Classify the different types of bones with examples.
- Describe the microscopic structure of various tissues (bone, muscles etc).
- Explain homeostasis and discuss the role of control system in maintaining homeostasis.
- Compare the prokaryotic and eukaryotic cells.
- Describe the significance, sources and functions of essential fatty acids.
- Describe the mechanism of cell injury.
- Explain the structure of bacteria.
- Discuss the different methods of sterilization.
- Discuss the various routes of drug administration.
- Explain the clinical significance of plasma half-life.
- Describe the drug clearance mechanism

SUBJECTS INTEGRATED IN THE MODULE

- Anatomy
- Physiology
- Biochemistry
- Oral Biology
- Pharmacology & Dental Therapeutics
- Microbiology

- Community Dentistry & Public Health
- General Pathology


SYLLABUS

THEORY			
GENERAL ANATOMY			
CODE	SPECIFIC LEARNING OUTCOMES	Total hours = 10	
		INTEGRATING DISCIPLINE	TOPIC
F-A-001	Define different branches of Anatomy		Introduction to Human Anatomy: Definitions, Terminology, and Planes
	Describe the "Anatomical Position"		
	Discuss the planes of body		
	Describe the terms related to position, movement and laterality		
F-A-002	Discuss the structural characteristics of compact and spongy bones		Osteology
	Classify bones based on region, size and shape providing examples of each, preferably from the head and neck		
	Describe the general characteristics of an adult typical long bone		
	Define ossification and briefly describe the process of intramembranous and endochondral ossification		
	Describe rule of ossification		
	Describe the blood supply of various types of bones		
	Describe the features of different views of skull (Anterior, Posterior, Superior, Inferior, Lateral)		
F-A-003	Describe the structural classification of Joints (fibrous, cartilaginous and synovial) along with their sub-classifications with examples of each		Joints
	Enlist the general characteristics of synovial joints		

	Enlist the factors stabilizing a synovial joint		
	Describe Hilton's Law		
F-A-004	Discuss and differentiate the gross features of hyaline, elastic and fibrocartilage		Cartilage
F-A-005	Describe the types of muscular tissue (skeletal, smooth and cardiac)		Myology
	Describe parts of a muscle		
	Classify and exemplify skeletal muscles on the basis of shape, fiber architecture and action		
F-A-006	Describe the two layers of skin (epidermis and dermis)		Integumentary System
HISTOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**Total hours = 21**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-A-007	Describe the electron microscopic structure and fluid mosaic model of plasma membrane		Cell
	List the membranous and non-membranous cellular organelles of cell		
	Describe the structure of the cellular organelles and correlate with their functions	Physiology	
	Describe the structure of different types of cell junctions	Oral Biology	
	Briefly describe the structure of nucleus		
F-A-008	Classify and exemplify the epithelia with their histological structure, locations, and functions		Epithelium
	Describe the electron microscopic structure & functions of the following apical cell surface specializations:		

	i. Microvilli ii. Stereocilia iii. Cilia		
	Describe the structure of basement membrane		
	Classify and exemplify the exocrine glands on the basis of: Shape of secretory portions and ducts mode of secretion and types of secretion and Shape of secretory portions and ducts		
F-A-009	List the connective tissue cells along with their functions		Connective Tissue
	Describe the composition of ground substance of connective tissue		
	Describe the structure of fibers of connective tissue		
	Classify connective tissue along with their examples		
	Draw and label light microscopic diagram of different types of connective tissue		
F-A-010	Describe the microscopic and ultramicroscopic structure of all types of cartilages		Cartilages
	Draw and label light microscopic diagram of different types of cartilages		
F-A-011	List the bone cells along with their functions		Bones
	Describe the composition of bone matrix (organic, inorganic)		
	Describe the histology of compact and spongy bone		
	Draw and label light microscopic diagram of compact and spongy bones		
F-A-012	Describe the microscopic structure and ultramicroscopic structure of skeletal, cardiac, and smooth muscles		Muscles

F-A-013	Draw and label light microscopic diagram of muscles		Lymphoid System
	Describe the light microscopic structure of lymphoid organs		
	Draw and label light microscopic diagram of lymphoid organs		
F-A-014	Describe the composition of epidermis and dermis		Skin
	Draw and label light microscopic diagram of thick and thin skin		
PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**Total Hours: 21**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-P-001	Define Homeostasis		Homeostasis: Control of Internal Environment
	Describe internal environment of the body		
	Differentiate between Extracellular and Intracellular Fluids (with special emphasis on comparing the concentration of sodium, potassium, and calcium ions)		
F-P-002	Name control system of body by giving examples		Control Systems of the Body
	Explain the positive, negative, and feed-forward mechanisms with examples		
F-P-003	Discuss organization of the cell		Cell and its Organelles and their Functions
	Explain the structure and functions of the cell membrane		
	Enlist the functions of Glycocalyx		
	Name different proteins of the cell membrane with their functions		
	Enlist membranous and non-membranous organelles		
	Enlist the self-replicative organelles		

	Differentiate between the functions of smooth and rough endoplasmic reticulum		
	Explain the functions of Golgi apparatus		
	Explain the functions of lysosomes		
	Explain the functions of peroxisomes		
	Compare functions of lysosomes and peroxisomes		
	Enlist functions of mitochondria and ribosomes		
	Enumerate the components and functions of the cytoskeleton		
F-P-004	Define and enlist types of endocytosis		Functional Systems of Cell
	Explain the mechanism of pinocytosis		
F-P-005	Enlist different transport mechanisms		Transport of Substance through Cell Membrane
	Discuss the process of simple diffusion across the cell membrane		
	Explain the process of facilitated diffusion		
	Compare features of simple and facilitated diffusion with examples		
	Classify different types of active transport		
	Describe primary and secondary active transport with examples		
	Enlist and explain functions of Na-K pump		
F-P-006	Discuss the components of blood		Blood with Special Emphasis on Red Blood Cells, Anemia and Polycythemia
	Enlist the functions of blood		
	Enlist plasma proteins		
	Enumerate the different sites of erythropoiesis at different ages		
	Enlist the stages of erythropoiesis		
	Discuss characteristics of red cells		
	Give normal range of red cells in blood, also their shape and size		
	Define blood indices mentioned as: MCV (mean corpuscular volume), MCH (mean corpuscular hemoglobin), and MCHC (mean corpuscular		

	hemoglobin concentration). Give their normal values & enumerate the conditions in which these values are disturbed		
	Discuss functions of red cells		
	Discuss the site and mechanism of production of erythropoietin and its role in erythropoiesis		
	Explain the significance of vitamin B12 and folic acid in maturation of red blood cells		
	Enumerate and elaborate role of factors/nutrients that are required and regulate erythropoiesis		
	Discuss components/structure of hemoglobin		
	Define sickle cell anemia		
	Discuss fate of red cells when they complete their life span		
	Define and classify anemia on the basis of morphology and cause.		
	Discuss the effects of anemia on circulation		
	Define and enlist types of polycythemias		
	Discuss the effects of polycythemias on circulation		

BIOCHEMISTRY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 37	
		INTEGRATING DISCIPLINE	TOPIC
F-B-001	Define carbohydrates and their general structure.		Carbohydrate
	Classify carbohydrates into monosaccharides, disaccharides, oligosaccharides, and polysaccharides and their biochemical importance		
	Define carbohydrate isomerism, differentiate between aldo-keto isomers, D & L isomers, epimers, and α & β anomers, and provide suitable examples of each relevant to dentistry (dental caries, salivary glycoproteins)		
	Differentiate between reducing and non-reducing sugars.		
	Define blood glucose levels and identify the normal ranges for fasting, random, and postprandial blood glucose measurements.		
	Define glycemic index and evaluate the impact of various dietary carbohydrates on blood sugar levels, highlighting their clinical significance.		
F-B-002	Define amino acids and classify standard amino acids according to side chain and nutritional importance		Amino Acid & Protein Classification with Importance
	Define and classify proteins on the based on their functions and axial ratio along with their biological significance		
	Explain the levels of protein organization (primary, secondary, tertiary, and quaternary structures) and their relevance to protein function.		
F-B-003	Define lipids and their Classification along with their biological importance		Lipids

F-B-004	Define and classify vitamins based on their solubility.		vitamins.
	Briefly explain the active forms, sources, (RDA), biological roles, and associated deficiency disorders of Vitamin B-complex including B1, B2, B3, B6, B9, and B12, vitamin E and Vitamin C in relation to RBC's.		
F-B-005	Define acids, bases, and pH in biological systems.		Acid, Base, pH & Buffers
	Explain the concept of pH scale and its importance in body fluids.		
	Enlist the buffer systems of the human body and their role in maintenance of homeostasis.		
	Describe the Henderson-Hasselbalch equation and its applications.		
F-B-006	Define enzymes and their role in biological reactions.		Enzymes
	Classify enzymes with examples of each		
	Explain the properties and mechanism of enzyme		
	Describe the factors affecting enzyme activity and regulation of enzyme		
F-B-007	Describe the fluid mosaic model of cell membrane		Cell
	Describe the role of cell organelles and describe the technique of subcellular fractionation for separation of cell organelles and enlist marker enzymes for various cell components.		
F-B-008	Define and classify receptors.		Signal Transduction Pathways
	Delineate the sequence of events in the signal transduction pathways involving Gs and Gq proteins.		

F-B-009	Differentiate between anabolism and catabolism, and list the metabolic pathways associated with each process.		Cell Energy Metabolism
	Outline the steps of glycolysis pathway including regulation of key enzymes with energetics		
	Differentiate between aerobic and anaerobic glycolysis, highlighting the fate of pyruvate in each condition		
F-B-010	Describe the structure of Heme and briefly describe the steps of Heme synthesis with its regulation.		Hemoglobin Structure, Types, and Functions
	How does Heme combine with Globin to form Hemoglobin and Enlist the functions of Hemoglobin		
	Enlist the types of hemoglobin along with their percentage and chain composition.		
	Explain the significance of HbA1c		
	Define and explain the biochemical basis of porphyria along with its classification.		
	Describe the oral and dental manifestations of porphyria, including erythrodontia, photosensitivity, mucosal lesions, and delayed healing.	Oral Pathology	
F-B-011	Describe and outline the steps in Hexose Monophosphate Pathway (HMP) and its significance in RBC's		Metabolic Pathways in Red Blood Cells
	Compare and contrast Glycolysis and the HMP Shunt		
	Explain hemolytic anemia due to pyruvate kinase and glucose 6 phosphate dehydrogenase deficiencies.		
F-B-012	Understand the oxygen-binding mechanism of hemoglobin, including the concepts of cooperative binding and allosteric regulation.		Oxygen Dissociation Curve
	Explain and draw the oxygen-hemoglobin dissociation curve for hemoglobin.		

	Give biochemical explanation for abnormally high oxygen affinity of hemoglobin in the stored blood.		
F-B-013	Describe the biochemical role of Selenium and Iron in RBC function, antioxidant defense, and erythropoiesis.		Biochemical Role of Selenium, Iron in RBC function
ORAL BIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 18**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-OB-001	The Tooth		Structure of Oral Tissues (A Brief Introduction)
	Supporting Tissues of the Tooth		
	Oral Mucosa		
	Salivary Glands		
	Bones of the Jaw		
	Temporomandibular Joint		
	Hard Tissue Formation		
	Mineralization		
	Hard Tissue Degradation		
	Enamel		
	Dentine		
	Cementum		
	Periodontal Ligament		
F-OB-002	Describe the structure, types, and functions of the cytoskeleton, including microfilaments, intermediate filaments, and microtubules, within oral tissues.		Cytoskeleton
F-OB-003	Classify and explain the functions of intercellular junctions, including tight junctions, adherents' junctions, desmosomes, and gap junctions, in oral epithelial tissues.	Histology (Anatomy)	Cell Junctions

	Illustrate the structural features and functions of desmosomes and hemidesmosomes in maintaining the integrity of oral epithelial tissues.		
F-OB-004	Describe the structure, secretory functions, and role of fibroblasts in the maintenance of the extracellular matrix in oral tissues		Fibroblast
	Explain the steps involved in collagen synthesis and assembly, highlighting its importance in oral connective tissue.		
F-OB-005	Discuss the composition, function, and degradation processes of the extracellular matrix, emphasizing its role in oral tissue integrity and repair.		Extracellular Matrix
F-OB-006	Name the three major functions of the human dentition	Tooth Morphology	Introduction and Nomenclature
	Describe various ways of classifying human dentition.		
	Define the three dentition periods (deciduous, mixed, permanent). Identify each period's approximate time intervals, initiation, and termination events		
	Describe the dental Formula for permeant and Deciduous dentition		
	Define "succedaneous" and identify succedaneous teeth		
	Describe the eruption pattern of primary and permanent dentition		
	Demonstrate understanding of various dental numbering systems (e.g., universal, FDI, Palmer).		
	Describe the anatomical surfaces and land marks of both anterior and posterior teeth, including the roots, using standardized dental terminology.		
	Identify and name tooth surfaces and thirds of tooth surfaces from diagrams or descriptions		
	Differentiate between the crown surfaces of teeth by matching them with their correct general shape		

	(triangular, trapezoidal, or rhomboidal), or by relating the shape to the specific function of the tooth.		
	Identify and name line and point angles based on diagrams or descriptions.		
	Define elevations and depressions on the tooth surface.		
	Applications to the type of root structure necessary for proper the function of the different teeth, and the general rules regarding tooth roots and the normal number of branches.		
GENERAL PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 07**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-Pa-001	Define the terms: pathology, etiology & pathogenesis		Pathology
F-Pa-002	Discuss causes of cell injury		Cell Injury
	Describe the types and mechanism of cell injury		
	Identify different types of cellular adaptations to stress with examples		
	Discuss the mechanism of cellular adaptations to stress in detail		
F-Pa-003	Identify the two types of cell death		Cell death
	Enumerate the differences between them		
F-Pa-004	Define necrosis		Necrosis
	Identify its various types with examples		

F-Pa-005	Define apoptosis with examples		Apoptosis
	Describe its mechanism and pathways in detail		
F-Pa-006	Discuss mechanism & types of intracellular accumulations		Intracellular accumulations
F-Pa-007	Define pigmentation and identify various endogenous & exogenous pigments		Pigmentation
F-Pa-008	Define calcification and differentiate between dystrophic & metastatic calcification		Calcification
F-Pa-009	Explain the changes taking place due to aging at the cellular level	Oral Biology	Aging
MICROBIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 20**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-Pa-010	Enlist microbes that cause infectious diseases along with important features.		General Microbiology
	Differentiate between Eukaryotes & Prokaryotes.		
F-Pa-011	Discuss morphology, structure of bacteria including cell wall, cytoplasmic membrane, and cytoplasm of bacteria.		Bacteria
	Discuss important structures outside cell wall & bacterial spores.		
	Differentiate between gram positive & negative bacterial cell wall on the basis of staining.		
	Discuss bacterial growth curve.		
	Define anaerobic & aerobic growth and discuss fermentation of sugars and iron metabolism.		

	Define mutation and its different types and Define Recombination		
	Discuss transfer of DNA within and between bacterial cells including conjugation, transduction, and transformation.		
	Discuss classification of medically important bacteria.		
	Define normal flora, colonizer, dysbiosis, and elaborate significance of normal flora.		
	Discuss normal flora of different body sites including oral cavity, skin, respiratory tract, intestinal tract, etc.		
	Define pathogen, pathogenesis, virulence factors, ID50, LD50.		
	Discuss principles of pathogenesis.		
	Enlist different types of bacterial infections and Describe stages of bacterial pathogenesis.		
	Discuss determinants of bacterial pathogenesis that includes: • Transmission • Adherence to cell surfaces. • Invasion • Inflammation & intracellular survival • Toxin production • Immuno-pathogenesis		
	Enlist different strains of the same bacteria that can produce different diseases.		
	Mechanisms of Antimicrobial Drugs		
	Define typical stages of an infectious disease.		
	Discuss role of biofilm and glycocalyx in causing infection.		

	Tabulate the differences between sterilization and disinfection.		
F-Pa-012	Define sterilization and disinfection and describe the various methods of sterilization.		Sterilization and Disinfection
	Tabulate the differences between sterilization and disinfection.		
PHARMACOLOGY & DENTAL THERAPEUTICS			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 17**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-Ph-001	Students should be able to discuss General Concepts of Pharmacology		General Pharmacology
	Students should be able to define and describe Pharmacokinetics and Pharmacodynamics		
	Mechanisms of Drugs Transport/ Permeation		
F-Ph-002	Sources of Drugs/ Active Principles		Drugs Transport
	Enumerate advantages and disadvantages of various Routes of drug Administration		
	Define drug absorption & Bioavailability and factors affecting		
	Define and explain Distribution and Volume of Distribution		
	Define and explain Redistribution and Plasma Protein Binding		
	Explain the concept of Metabolism & Biotransformation		
F-Ph-003	Define Enzyme Induction & Enzyme Inhibition		Enzyme Induction & Enzyme Inhibition
	Describe the clinical significance of enzyme induction and enzyme inhibition with their examples		
	Define drug excretion		
F-Ph-004	Enlist routes of drug excretion		Drug excretion

	Describe processes of drug excretion through the kidneys		
	Describe factors affecting glomerular filtration & tubular reabsorption		
	Describe the Clinical Significance of Glomerular Filtration, Active Tubular Secretion and Passive Tubular Reabsorption of Drugs		
	Define first pass elimination		
F-Ph-005	Define and enlist factors affecting Plasma Half-Life		Plasma Half-Life
	Explain clinical significance of plasma half-life		
	Explain steady state plasma concentration		
F-Ph-006	Define & Explain Elimination and Orders of Elimination – First & Zero Order Kinetics with examples		Order Kinetics
	Tabulate differences between First order kinetics and Zero Order Kinetics		
F-Ph-007	Define, explain & calculate maintenance dose and loading dose using appropriate formula		Maintenance dose
F-Ph-008	Understand the concept of drug clearance		Drug clearance
	Describe factors affecting drug clearance		
	Explain the Clinical Significance of different values of Drug Clearance		
F-Ph-009	Elaborate Transmembrane signaling pathways		Signaling pathways
	Name the Effectors controlled by G-proteins		
F-Ph-010	Define Pharmacodynamics, Affinity, Efficacy, Potency		Pharmacodynamics
	Explain Agonist, partial agonist, inverse agonist, bias, allosteric agonists and modulators with examples		
	Define Spare receptor and give clinical importance		

	Describe various Drug–antagonism types with examples		
	Compare & discuss the information derived from Graded and Quantal dose-response curves		
	Define Median Effective (ED50), Median Toxic (TD50) & Median Lethal Dose (LD50) and its clinical relevance		
	Define Therapeutic index and give its clinical importance		
	Define Therapeutic window and give its clinical importance		
	Define Desensitization, Tachyphylaxis, Tolerance, Resistance, super sensitivity, hypersensitivity, super infection, iatrogenic effect, idiosyncrasy, and give examples		
	Describe the Phenomenon of down regulation and up regulation of receptors		
	Enlist factors affecting Dose and action of Drugs		
F-Ph-011	Describe Pharmacogenetics and give examples		Pharmacogenetics
F-Ph-012	Illustrate various phases of Drug development		Drug development
F-Ph-013	Describe Drug Interactions		Drug Interactions
COMMUNITY DENTISTRY AND PUBLIC HEALTH			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-CD-001	Define dental public health, health and its dimensions, disease, and illness.		Public Health
	Difference Between clinical and public health Dentist.		
	Identify criteria for a disease to be of public health importance.		
	Describe the Concepts of prevention and its levels.		

PRACTICAL / LAB WORK OF FOUNDATION MODULE			
PHARMACOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS =02**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-Ph-014	Calculations of drug dosing (e.g., IV infusion) & dose of children.		Calculation
F-Ph-015	Calculations (Mean, Mode, Median, Standard Deviation, and Standard Error), and Metrology.		Drug dosing
ORAL BIOLOGY AND TOOTH MORPHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS =10**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-OB-007	List all structures of a tooth. Identify, draw, and label structures of the tooth on models.	Oral Histology Tooth Morphology	Enamel, Dentine, Pulp, Cementum, Periodontal Ligament, Salivary gland, TMJ, Oral Mucosa.
F-OB-008	Identify and differentiate, on tooth specimen/models/images: anatomical crown, clinical crown, anatomical root, clinical root, enamel, dentin, cementum, cervical line, pulp cavity, cusps, tubercles, cingulum, ridges (marginal, triangular, transverse, oblique and cusp ridges), inclined plane, mamelons, fossa, developmental (primary) groove, supplemental (secondary) groove, line angles, point angles, and tooth surfaces (mesial, distal, lingual/palatal, buccal/labial, incisal/occlusal),		Introduction & Nomenclature of tooth
	Carve tooth models in wax/soap (one anterior & one posterior) and demonstrate the morphological features.		

	Identify & number different teeth according to universal, palmar notation & FDI numbering systems		
F-OB-009	Draw & label the diagram of cytoskeletal elements.	Oral Histology	Cytoskeleton
F-OB-010	Draw & label the diagram of tight junctions, desmosomes, hemidesmosomes, and gap junctions.		Cell Junctions
F-OB-011	Draw and label steps of collagen synthesis and assembly		Fibroblast

MICROSCOPIC ANATOMY (HISTOLOGY)			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS =13**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-A-015	Identify under a light microscope and draw & label different types of epithelia.		Epithelium
F-A-016	identify under a light microscope and draw & label different types of connective tissues.		Connective tissue
F-A-017	Identify under a light microscope and draw & label different types of cartilages.		Cartilage
F-A-018	Identify under a light microscope and draw & label compact and spongy bones.		Bone
F-A-019	Identify under a light microscope and draw & label different types of muscles.		Muscle
F-A-020	Identify under a light microscope and draw & label lymphoid organs.		Lymphoid organs
F-A-021	Identify under a light microscope and draw & label thick and thin skin.		Skin

PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS =5**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-P-007	Parts of Microscope and their functions and how to operate it		Microscope

F-P-008	How to Obtain verbal consent from subject before and observation of drawing blood for CBC testing.		CBC Report Analysis
	Interpret the RBC count, hemoglobin, concentration and hematocrit in the CBC report generated by automated Analyzer		
F-P-009	Read and interpret ESR result on Westergren's tube and mentions conditions in which ESR is increased or decreased physiologically and pathologically.		ESR
PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS =04**	
		INTEGRATING DISCIPLINE	**TOPIC**
F-Pa-013	Identify the types of necrosis on slides/ pictures	Pathology	Cell Injury
F-Pa-014	Identify the cellular adaptation (atrophy, metaplasia, hyperplasia)		Cell Adaptations
F-Pa-015	Demonstrate the proper usage of hot air oven and autoclave.	Microbiology	Sterilization
F-Pa-016	Perform centrifugation and micro pipetting	Hematology	Introduction to Lab Techniques

UNIVERSITY OF HEALTH SCIENCES LAHORE

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Module No. 02

CRANIOFACIAL-I

MODULE RATIONALE

The Craniofacial 1 provides foundational knowledge on the general embryology and also embryological and structural development of the craniofacial region and the genetic disorders associated with the craniofacial complex. It serves as a critical phase in building the foundational knowledge necessary for advanced clinical modules.

MODULE OUTCOMES

- Explain the general embryological processes and underlying craniofacial development, including the formation and differentiation of the skull, face, palate, and temporomandibular joint (TMJ).
- Identify genetic mechanisms involved in craniofacial anomalies and systemic diseases.
- Demonstrate practical skills in identifying development of craniofacial structures.
- Integrate multidisciplinary knowledge to develop a comprehensive understanding of craniofacial development, enabling effective foundation for clinical contexts such as orthodontics, oral surgery, and periodontology.

SUBJECTS INTEGRATED IN THE MODULE

1. Anatomy
2. Oral Biology
3. General Pathology
4. Microbiology


SYLLABUS

THEORY			
ANATOMY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS =42	
		INTEGRATING DISCIPLINE	TOPIC
CF1-A-001	Briefly describe the process of mitosis and meiosis		Cell Division
CF1-A-002	Describe the process of oogenesis, including the stages and regulatory mechanisms involved.		Gametogenesis
	Describe spermatogenesis and spermiogenesis, highlighting their roles in male fertility.		
	Describe the embryological basis of teratoma.		
CF1-A-003	Discuss the ovarian cycle, hormonal regulation and its phases.		First week of development: Ovulation to implantation
	Enlist and explain the main outcomes of fertilization and their relevance to early embryonic development.		
CF1-A-004	Describe the embryological basis of hydatidiform mole and its pathological significance.		Second week of Development: Bilaminar Germ Disc
	Describe the formation of embryonic disc, amniotic cavity and yolk sac		
CF1-A-005	Discuss the process of gastrulation		Third Week of Development: Trilaminar Germ Disc
	Discuss the growth and differentiation of the embryonic disc, including the clinical implications of its anomalies.		
	Describe the embryological basis for situs inversus, sirenomelia, holoprosencephaly		
	Describe the development of trophoblast during third week of development		
CF1-A-006	Explain the stages of neurulation and the formation of the neural tube.		Third to Eight Weeks:

	Describe the process of vasculogenesis and its role in embryonic vascular development.		Embryonic Period
	Discuss craniosynostosis (premature closure of sutures) and its impact on skull and brain growth.		
CF1-A-007	Discuss the clinical presentation of numerical and structural chromosomal abnormalities		Birth Defects
ORAL BIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 33**	
		INTEGRATING DISCIPLINE	**TOPIC**
CF1-OB-001	Describe the origin, migration, and differentiation of neural crest cells, and explain their contributions to the formation of bone, cartilage, connective tissues in craniofacial development and the associated development defects.	General Embryology (Anatomy)	Neural Crest Cells and Head Formation
CF1-OB-002	Describe the formation, organization, and derivatives (muscles, nerves, skeletal structures) of the five pharyngeal (branchial) arches and its clinical implications	General Embryology (Anatomy)	Branchial (Pharyngeal) Arches and the Primitive Mouth
	Identify the embryological contributions of the pharyngeal pouches, grooves, and membranes and its clinical implications (Branchial Cleft Cysts and Fistulas).		
CF1-OB-003	Describe the key facial prominences (frontonasal, maxillary, and mandibular) and their fusion process in forming the forehead, nose, upper lip, and jaw.		Formation of the Face
	Discuss the critical periods of facial development, teratogenic factors disrupting it, and the clinical implications of improper facial fusion, including anomalies like cleft lip and midline facial clefts		

CF1-OB-004	Describe the development of the primary and secondary palate, including the growth, elevation, and fusion of palatal shelves, and discuss the molecular signals involved in palatal development and its clinical implications due to non- fusion like Cleft Palate including the teratogenic factors that cause it.	Oral Embryology, Oral pathology	Formation of the Palate
CF1-OB-005	Describe the embryonic development of the tongue, contributions of key structures (lateral lingual swellings, tuberculum impar, copula), muscle derivation, and sensory/motor innervation and Developmental Defects associated with it like ankyloglossia	Oral Embryology, Oral Pathology	Formation of the Tongue
CF1-OB-006	Explain the two types of ossification: intramembranous (flat bones) and endochondral (base of the skull).	Oral Histology, Oral Embryology, Oral Pathology	Development of the Mandible and Maxilla
	Describe the role of Meckel's cartilage in mandibular development and the process of intramembranous ossification in forming the mandible and maxilla.		
	Define jaw size anomalies and their embryological basis and clinical impact (Micrognathia and Macrognathia).		
CF1-OB-007	Describe the development of the temporomandibular joint (TMJ), including the role of secondary cartilage, and potential developmental disorders (congenital dislocation, condylar hypoplasia	Oral Embryology, Oral Pathology	Development of the Temporomandibular Joint (TMJ)
CF1-OB-008	Describe the formation of the primary epithelial band and its role in initiating tooth development.	Oral Embryology	Early Tooth Development
	Explain the process of tooth initiation and the molecular signals involved in odontogenesis.		

	Discuss the determination of different tooth types based on patterning signals in the oral ectoderm.		
CF1-OB-009	Describe the histological and morphological changes that occur during the bud stage of tooth development	Oral Embryology	Stages of Tooth Development
	Explain the bud-to-cap transition and the role of epithelial-mesenchymal interactions in tooth differentiation.		
	Describe the histological and morphological changes that occur during the cap stage of tooth development.		
	Describe the histological and morphological changes that occur during the bell stage of tooth development.		
	Describe the role of signaling centers such as the enamel knot in controlling tooth shape and structure.		
CF1-OB-010	Explain the process of hard tissue formation, including enamel, dentin, and cementum development in reference to late bell stage of the tooth development	Oral Embryology	Neural and Vascular Contributions
CF1-OB-011	Describe the role of nerve innervation and vascularization during early tooth development and how they contribute to tissue differentiation.		Formation of the Permanent Dentition
CF1-OB-012	Discuss the mechanisms of root development and the role of Hertwig's epithelial root sheath (HERS) in determining root length and shape.		Hard Tissue and Root Formation
	Describe the formation of the supporting tissues of the tooth, including the periodontal ligament, cementum, and alveolar bone in reference to late bell stage		

CF1-OB-013	Differentiate between the development of primary and permanent dentition and explain the timing of their formation.		Primary and Permanent Dentition
CF1-OB-014	Enlist, Define and Identify developmental Anomalies in Tooth Number	Oral Pathology	Developmental Anomalies related to Tooth Development and Dental Structures
	Enlist, Define and Identify developmental Anomalies related to Tooth Size		

GENERAL PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 10**	
		INTEGRATING DISCIPLINE	**TOPIC**
CF1-Pa-001	Define genetic disorders and explain their causes.	Biochemistry	Genetic Disorders: Introduction and causes
CF1-Pa-002	Describe different types of mutations (point mutations, insertions, deletions) with examples relevant to dentistry		Types of Mutations
CF1-Pa-003	Explain Mendel's principles and their application to autosomal and X-linked disorder and examples relevant to dentistry		Mendel principles and genetic disorders
CF1-Pa-004	Describe chromosomal abnormalities (e.g., trisomy, monosomy, translocations) and examples relevant to dentistry	Embryology	Chromosomal abnormalities

CF1-Pa-005	Define, Identify and Correlate specific syndromes with their embryological defects i. Down Syndrome ii. Turner Syndrome iii. Treacher Collins Syndrome iv. Pierre Robin Sequence v. Goldenhar Syndrome vi. Crouzon Syndrome vii. Apert Syndrome viii. Van der Woude Syndrome ix. Hemifacial Microsomia x. Cleidocranial Dysplasia xi. Nager Syndrome xii. DiGeorge Syndrome	Embryology, OMFS, Orthodontics, Oral Pathology	Congenital Craniofacial Anomalies and Developmental Defects
CF1-Pa-006	Describe how PCR and sequencing help in genetic testing.	Biochemistry	Genetic testing
	Compare different genetic tests and their uses.		
	Differentiate between karyotyping, sequencing, and biochemical tests.		
	Identify the role of genetic tests in prenatal and carrier screening.		
MICROBIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 03**	
		INTEGRATING DISCIPLINE	**TOPIC**
CF1-Pa-007	Define microbial teratogens and their role in congenital craniofacial and dental anomalies.	Pharmacology	Infectious diseases

CF1-Pa-008	Define TORCH infections and identify the impact of maternal infections (TORCH complex) on embryonic development and their dental implications.	Embryology	Infectious diseases

PRACTICAL / LAB WORK

ORAL BIOLOGY & TOOTH MORPHOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS =07	
		INTEGRATING DISCIPLINE	TOPIC
CF1-OB-015	Identify the congenital defects (cleft lip and palate,) on pictures/models:	Oral Embryology	Development of Human embryo with special emphasis on tooth-related structures.
	Identify the common tongue anomalies on pictures/models: Aglossia, micro/macroglossia, fissured tongue, cleft tongue, bifid tongue, tongue tie		
CF1-OB-016	Draw and label different stages of tooth development		Tooth Development
	Draw and label the root formation of single-rooted and multi-rooted teeth		

Module No. 03

CARIOLOGY-I

MODULE RATIONALE

This module establishes a comprehensive foundation in cariology, focusing on the biological, microbial, and environmental factors in dental caries development. By building this knowledge base, students are prepared for advanced applications in clinical practice and public health initiatives. Since caries follows the same biological principles worldwide, the methods for teaching its underlying biology, etiology, epidemiology, prevention, diagnosis, and treatment should also be consistent.

MODULE OUTCOMES

- Describe the basic structure and function of teeth.
- The natural history of dental caries
- Identify the microbial, dietary, and environmental factors in caries formation.
- Evaluate the impact of dietary habits, saliva composition, and environmental factors on caries development.
- Explain the principles of caries prevention and oral hygiene
- Discuss caries prevention strategies

SUBJECTS INTEGRATED IN THE MODULE

1. Oral Biology
2. Biochemistry
3. Community Dentistry and Public Health
4. Oral Pathology
5. Operative Dentistry


SYLLABUS

THEORY			
ORAL BIOLOGY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 22	
		INTEGRATING DISCIPLINE	TOPIC
Car1-OB-001	Describe the physical & chemical properties of enamel	Operative dentistry	Enamel
	Describe the structural organization of enamel and Identify the enamel on radiograph		
	Describe the Differentiation of ameloblasts with reference to reciprocal induction		
	Describe the life cycle of Ameloblast		
	Enlist the stages of Amelogenesis and describe the pre secretory stage		
	Describe the secretory stage of amelogenesis and role of Tom's process		
	Describe the maturative stage of amelogenesis and process of modulation		
	Classify enamel proteins according to their function during amelogenesis		
	Describe the regulation of pH during enamel formation		
	Describe the structural features of enamel, including: (Hunter-Schreger bands, Incremental lines, Enamel lamellae, Enamel tufts, Enamel spindles, Gnarled enamel)		
	Discuss the effects of fluoride on enamel structure and resistance to caries.		
	Discuss the principles of enamel etching and its importance in restorative dentistry.		

	Describe the age changes & repair/regeneration of enamel		
	Explain how developmental disturbances can affect enamel formation.		
Car1-OB-002	Describe the composition and structure of dentin		Dentin
	Describe the process of dentinogenesis, including the role of the molecular factors.		
	Differentiate between the three main types of dentin: primary, secondary, and tertiary, and describe their locations and formation.		
	Identify the structure of dentin radiographically		
	Describe the mechanisms that control dentin mineralization, and differentiate between the pattern of mineralization in mantle dentin and circumpulpal dentin.		
	Explain the processes of secondary and tertiary dentinogenesis, including the stimuli that trigger their formation.		
	Describe the structure and function of dentinal tubules.		
	Differentiate between peritubular and intertubular dentin, and explain their respective compositions and roles.		
	Explain the formation and significance of sclerotic dentin and interglobular dentin.		
	Describe the structural features of dentin, including incremental growth lines and granular layer of Tom's.		
	Describe the cellular contents of the dental pulp		

	Discuss the innervations, vascular supply & lymphatic supply of the dentin-pulp complex		
	Explain the mechanisms of dentin sensitivity, focusing on the hydrodynamic theory.		
	Describe the formation and clinical significance of pulp stones (denticles).		
	Explain how developmental disturbances can affect Dentine formation (Denitnogenesis Imperfecta and dysplasias)		
	Explain the age-related changes that occur in the dentin-pulp complex.		
Car1-OB-003	List down the components of saliva. State the functions of saliva.		Saliva
Car1-OB-004	Differentiate between the following terms: Lobe, Axial Position, Contact Area, Interproximal space, Embrasure, Height of Contour, Cervical Line, Gingival Line, Epithelial Attachment.		Tooth Morphology
	Describe the number and names of the lobes of the anterior and posterior teeth		
	Describe and differentiate contact areas and height of contours including their location, size, function, age related changes, and clinical significance		
	Describe the components, boundaries and functions of interproximal space and embrasures		
	Describe the depressions on tooth surface (pit, fissures, and developmental groves)		
BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 08**	
		INTEGRATING DISCIPLINE	**TOPIC**

Car1-B-001	Explain the biochemical properties of sucrose, glucose, and fructose.	Operative Dentistry	Biochemical Role of carbohydrates in Dental Caries
	Compare the cariogenic potential of sucrose, glucose, and starch,		
Car1-B-002	Illustrate the glycolytic pathway in cariogenic bacteria and its role in acid production.	Biochemistry	Carbohydrate Metabolism and Acidogenesis in relation to Dental Caries
	Explain the process of lactic acid fermentation, including the conversion of pyruvate into organic acids.		
	Explain the concept of acidogenicity and aciduricity in cariogenic bacteria.		
Car1-B-003	Identify and analyze the components of saliva (salivary proteins, enzymes, bicarbonate, statherin, lysozyme, lactoferrin, amylase, histatins) and their functions in maintaining oral pH and enamel repair		Saliva's Biochemical Role
	Describe the buffering action of saliva (bicarbonate, phosphate, and protein buffers).		
	Discuss factors that affect salivary flow and pH regulation.		
	Explain the role of carbonic anhydrase in maintaining oral pH.		
Car1-B-004	Discuss how fluoride disrupts bacterial glycolysis and acid production.		Fluoride's Biochemical Mechanism
COMMUNITY DENTISTRY AND PUBLIC HEALTH			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 08**	
		INTEGRATING DISCIPLINE	**TOPIC**
Car1-CD-001	Discuss the importance and role of diet in caries.		Dental Caries
	Discuss the concept and importance of Stephen curve in dental caries		
	Role of dental biofilm in acid production		
	Discuss the concept of Demineralization and the remineralization process		

	Describe the importance of oral hygiene and its effects on caries.		
	Explain the concept of Keye's Circles in the etiology of dental caries		
Car1-CD-002	Classify Basic types of toothbrushing		Prevention of Dental Caries
	The clinical effect of tooth cleaning		
	The effect of dental flossing		
	Identify the basic concept and importance of fluoride in caries prevention		
	Discuss preventive measures, such as fluoride treatments, improved oral hygiene practices, and dietary modifications.		
ORAL PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 08**	
		INTEGRATING DISCIPLINE	**TOPIC**
Car1-OP-001	Knows the etiology and pathogenesis of acquired and generalized enamel hypoplasia.	Operative Dentistry/ Radiology	Enamel & Dentine Developmental Anomalies
	Know the types of amelogensis imperfecta according to their clinical and radiological appearance.		
	Identify and classify the developmental disturbances in structure of dentin.		
	Describe and compare the clinical presentation, radiographic and histopathological features of dentinogenesis imperfecta and dentin dysplasia.		
Car1-OP-002	Define phenomenon of dental caries.	Operative Dentistry & Oral Radiology	Microbiology and Pathogenesis of Caries
	Identify the etiological factors and explain their effects (pathogenesis) in the development of caries.		
	Describe the microbiological aspect of caries; the role and characteristics of cariogenic bacteria.		
	Define plaque and stages of plaque development		

	Describe the changes that develop in enamel and dentin of erupted teeth in association with microorganisms.		
OPERATIVE DENTISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 06**	
		INTEGRATING DISCIPLINE	**TOPIC**
Car1-OD-001	Describe the anatomical features of pits and fissures and their role in caries susceptibility.	Operative Dentistry & Oral Radiology	Pit and Fissure Caries
	Explain the preventive strategies, including using sealants and fluoride applications.		
Car1-OD-002	Discuss the factors that increase caries risk on smooth surfaces, such as poor oral hygiene and dietary habits.	Operative Dentistry & Oral Radiology	Smooth Surface Caries
	Describe the appearance of smooth surface caries and its progression pattern.		
	Recognize the role of fluoride in preventing smooth surface caries.		
Car1-OD-003	Identify the unique etiological factors associated with root carries, including gingival recession and xerostomia.		Root Caries
	Describe the clinical features and progression of root caries.		
Car1-OD-004	Describe the characteristics of active caries, including appearance, texture, and progression.		Active Caries
	Understand the clinical significance of active caries in its potential to progress and cause further tooth damage.		
	Develop strategies to manage active caries, focusing on preventive, minimally invasive, and restorative approaches.		
Car1-OD-005	Define arrested caries and describe their clinical features, such as smooth, shiny surfaces and hardness upon probing.	Operative Dentistry & Oral Radiology	Arrested Caries

	Understand the biological process of caries arrest and remineralization.		
	Identify the factors that promote caries arrest.		
Car1-OB-006	Compare the metabolism of sugar alcohols (xylitol, sorbitol) versus fermentable sugars in the oral cavity.		Role of Artificial Sweeteners and Sugar Substitutes
	Explain the mechanism by which xylitol inhibits *Streptococcus mutans* growth and acid production.		

PRACTICAL / LAB WORK			
OPERATIVE DENTISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 04**	
		INTEGRATING DISCIPLINE	**TOPIC**
Car1-OD-006	Identify fluoride gel and procedure to apply it	Community Dentistry	Prevention of Dental Caries
Car1-OD-007	How to use Disclosing agents for Identification of Dental Plaque on tooth surfaces		Identification Plaque
	Identification on tooth models pits an fissure caries, smooth surface caries and root caries on E-Slides or clinical images.		
	Identify the features of Arrested Caries and Active Caries on E-Slides or clinical images		
ORAL BIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 10**	
		INTEGRATING DISCIPLINE	**TOPIC**
Car1-OB-005	Draw and label "Enamel rods: fish scale pattern & keyhole pattern		Enamel
	Ameloblasts (life cycle)		
	DEJ with organic defects		
	Draw and label Enamel rods, striae of retzius, bands of Hunter & Schreger, gnarled enamel, DEJ, tufts, lamella, spindles & neonatal lines.		
	Identify amelogenesis imperfacta (hypoplastic, hypocalcified &hypomaturative types) & fluorosis.		
	Identify enamel on x-rays.	Dental Radiology/ Oral Pathology	
	Prepare the ground section of the tooth, mount it on a microscopic slide & identify the structural details of enamel & dentin		

Car1-OB-006	Draw & label primary, secondary & tertiary dentin, dentinal tubules in crown & root portions, dentin-pulp complex showing dentinal tubules, pre dentin & zones of dental pulp showing its different cells, odontoblast with different developmental shapes, peritubular and intra tubular dentin, inter globular dentin, dead tracts, pulp stones.	Dental Radiology	Dentin
	Identify dentin genesis imperfect, identify dentin & pulp cavity on x-rays.		
Car1-OB-007	Identify and differentiate on tooth specimen/models/images: periodontium, lobe, axial position, contact point, contact area, interproximal space, embrasure, line angle, height of contour, cervical line, gingival line, and epithelial attachment.	Tooth Morphology	Anatomic & Physiologic Considerations of Form & Function of Tooth
Car1-OB-008	Identify and differentiate on tooth specimen/models/images: pits, fissures, embrasures, and sulcus.	Tooth Morphology	Introduction & Nomenclature of tooth
ORAL PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 06**	
		INTEGRATING DISCIPLINE	**TOPIC**
Car1-OP-003	Examine the histopathological changes in enamel and dentine associated with caries in E-Slides/ Pictures		Histopathological changes in Enamel and Dentine
Car1-OP-004	Identify bacteria in dental plaque samples using Gram Staining under microscope		Microscopic Analysis of Plaque
Car1-OP-005	Identify pathological processes in a carious ground section of tooth slide.		Microscopy of Caries lesions

BDS Integrated Curriculum 2K25

Version 01

BLOCK 02

YEAR-01

UNIVERSITY OF HEALTH SCIENCES LAHORE

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Module No. 04

CRANIOFACIAL-II

MODULE RATIONALE

Craniofacial-II synthesizes gross anatomy of the skull, scalp, face, orbit, mandible, cranial fossae, and paranasal sinuses with the physiology and pharmacology of nerve and muscle function. Emphasis on extracranial landmarks and surface markings of cranial nerves, vascular structures, and the temporomandibular joint enables students to correlate structural knowledge with clinical procedures such as local anesthesia administration, TMJ disorder assessment, and minor oral–maxillofacial surgery. By integrating anatomy, physiology, biochemistry and pharmacology, learners will develop the foundational competencies required for accurate diagnosis, treatment planning, and procedural execution in dentistry.

MODULE OUTCOMES

- Apply topographic anatomy of the skull, scalp, facial layers, orbit, mandible, temporal/infratemporal/pterygopalatine fossae, and paranasal sinuses to identify key landmarks and foramina for clinical assessment.
- Map extracranial courses and branches of the trigeminal (V), facial (VII), oculomotor (III), trochlear (IV), and abducent (VI) nerves, and explain their relevance to facial sensation, expression, and anesthesia techniques.
- Correlate TMJ structure and histology with neuromuscular biomechanics—including motor units, muscle spindles, and Golgi tendon organs—to analyze normal function and common TMJ pathologies.
- Explain neuromuscular physiology and muscle and connective tissue biochemistry by detailing membrane potentials, action potential generation and propagation, neuromuscular junction transmission, and excitation–contraction coupling in skeletal muscle.
- Integrate pharmacology of neuromuscular blockers (depolarizing and non-depolarizing agents) with clinical indications and side-effect profiles for safe perioperative management along with basic concepts of microbiology.
- Demonstrate surface marking techniques for extracranial branches of cranial nerves and major facial vessels to guide diagnostic palpation, nerve blocks, and minor surgical procedures.

SUBJECTS INTEGRATED IN THE MODULE

- Oral Biology
- Anatomy
- Physiology
- Biochemistry
- Microbiology
- Pharmacology


SYLLABUS

THEORY			
ORAL BIOLOGY & TOOTH MORPHOLOGY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 20	
		INTEGRATING DISCIPLINE	TOPIC
CFII-OB-001	Describe the organic and inorganic components of the bone matrix	Oral Histology General Histology	Bone
	Distinguish between compact and spongy bone, and their locations and functions.		
	describe the origin of bone cells and the molecular factors involved		
	Describe the functions of osteoblasts, osteocytes, and osteoclasts in Bone Formation and Remodeling		
	Understand the processes of intramembranous and endochondral ossification.		
	Describe the microscopic Structure of Bone: (Osteon, central canal, lamellae, lacunae, canaliculi, and blood vessels).		
	Relate bone histology to dental procedures such as tooth extraction, implant placement, and bone grafting.	Oral Histology OMFS	
CFII-OB-002	Describe the histology of the temporomandibular joint (temporal and condylar bone, muscles, capsule, disk, synovial membrane, and ligaments)	Anatomy	Temporomandibular Joint
CFII-OB-003	Describe the concept of muscle contraction illustrating the role of the motor unit, muscle spindles, and Golgi tendon organs.	Physiology	Muscle Contraction (TMJ)
	Describe the nerve supply of the joint emphasizing the role of nerve endings	Oral Histology, Anatomy, Oral Medicine	
	Describe the biomechanics of TMJ		

	identify the common TMJ associated clinical manifestations		
CFII-OB-004	Describe the anatomy and histology of the maxillary sinus	Gross Anatomy	Maxillary Sinus
GROSS ANATOMY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 28**	
		INTEGRATING DISCIPLINE	**TOPIC**
CFII-A-001	Describe the features and structures of different views of skull (Anterior, Posterior, Superior, Inferior, Lateral)	Human Anatomy	Skull
	Discuss the sutures and fontanelles of skull, their age changes and clinical significance.		
	Identify and enlist all the formina of the skull along with their neurovascular contents		
CFII-A-002	List the layers of scalp and describe the anatomical features with neurovascular supply and lymphatic drainage of scalp.	Neuro Anatomy, Human Anatomy	Scalp
	Give anatomical justification of spread of scalp infections, profuse bleeding in superficial scalp lacerations, gaping of scalp wounds		
CFII-A-003	Enlist in tabulated manner the muscles of facial expression, giving their nerve supply and actions.	Anatomy	Face
	Describe the extracranial course, branches, and distribution of the facial nerve. Explain the causes and clinical consequences of damage to the nerve.		
	Describe the extracranial course, branches, and distribution of trigeminal nerve. Explain the causes and clinical consequences of damage to the nerve.		
	Describe the innervation of the maxillary and mandibular teeth, and their supporting structures and the anatomical basis of common variations in sensory innervation of the teeth.		

	Describe the vascular supply and lymphatic supply of face.	General Pathology, Anatomy	
	Describe the danger area of face with it its clinical significance. Define the routes of spread of infection from face and scalp to brain		
CFII-A-004	Define the boundaries and openings of orbital cavity. List the structures traversing these openings.	Anatomy	Vision
	In a tabulated manner enlist the extraocular and intraocular muscles of eyeball and eyelid muscles giving their nerve supply and actions		
	List and define the movements of eyeball with special reference to the axis		
	List the parts of Lacrimal apparatus giving their location and anatomical features. Describe the nerve supply of lacrimal gland		
	Describe the extracranial course, distribution and branches of oculomotor, trochlear and abducent nerves. Describe the location, roots and distribution of ciliary ganglion		
	Give the clinical correlates of nerves supplying the muscles of the eyeball		
	Describe the course and branches of ophthalmic artery mentioning its origin and termination		
	Give the anatomical structure of eyeball emphasizing on its three coats and their neurovascular supply		
CFII-A-005	Describe the bony features of mandible.	Anatomy	Mandible and Temporomandibular Joint
	Describe temporomandibular joint mentioning its ligaments, nerve supply and movements.		
	Identify and describe the muscles of mastication along with origin, insertion, action, and innervation of each muscle	OMFS, Anatomy	
CFII-A-006	Describe the boundaries contents and primary communications of temporal, infratemporal and pterygopalatine fossa	Anatomy	Temporal, Infratemporal and

	Describe the location, roots and distribution of pterygopalatine ganglion		Pterygopalatine fossa
CFII-A-007	Describe the anatomical features and neurovascular supply of external ear		Ear
	Describe the boundaries, contents, neurovascular supply and communications of middle ear cavity		
	Describe the anatomical features of auditory tube		
	Describe the parts, anatomical features and neurovascular supply of internal ear		
	Describe the course and distribution of vestibulocochlear nerve		
CFII-A-008	Describe the anatomical features and neurovascular supply of external nose		Nose
	Describe the boundaries of nasal cavity: nasal septum, lateral wall of nose, roof and floor. Give their anatomical features and neurovascular supply		
	List the paranasal sinuses giving their locations, openings, neurovascular supply and clinical significance.		
	Discuss the clinical correlates of nose: Epistaxis, Foreign body in the nose.		
CFII-A-009	Identify and classify fractures of the maxilla based on anatomical patterns (Le Fort classification)	OMFS, Anatomy	Applied Anatomy
	Identify and classify fractures of the mandible based on anatomical regions		
BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 24**	
		INTEGRATING DISCIPLINE	**TOPIC**
CFII-B-001	Describe the structure and function of myoglobin, its role in oxygen storage and delivery in muscle tissue,	Biochemistry	Biochemistry and Structural

	and its significance as a biochemical marker in muscle injury and how is it different from hemoglobin		Basis of Muscle Function and Integrity
	Describe the structure, types, and functions of collagen and elastin, and explain their roles in maintaining the mechanical strength and elasticity of muscle connective tissue.		
	Identify disorders associated with collagen and elastin defects, particularly those affecting muscle support structures and connective tissue integrity.		
	Explain the composition and function of the extracellular matrix (ECM) in muscle tissue, including the roles of proteoglycans, collagen, fibronectin, and integrins in muscle cell adhesion, signaling, and repair.		
	Differentiate muscle fiber types (Type I, IIa, IIb) based on structure, metabolism, and functional properties.		
CFII-B-002	Describe the mechanism of glucose uptake into tissues through glucose transporters and explain its role in cellular energy availability.	Biochemistry	Energy production in Muscles
	Explain the function and regulation of the pyruvate dehydrogenase (PDH) complex in linking glycolysis to the tricarboxylic acid (TCA) cycle.		
	Describe the TCA cycle and explain how it generates reduced coenzymes (NADH, $FADH_2$) that fuel oxidative metabolism.		
	Explain the structure and function of the electron transport chain (ETC) and describe how oxidative phosphorylation, utilizing ATP synthase, generates ATP through the proton motive force.		
	Identify the effects of ETC inhibitors and uncouplers on electron transport and ATP synthesis, and discuss their implications for cellular energy production.		
	Explain the processes of glycogenesis and glycogenolysis in muscle tissue, including their regulation, the role of key enzymes, and their contribution to ATP production during exercise.		

	Discuss the role of muscle glycogen as an energy source during different exercise intensities, its depletion and recovery, and how regular exercise influences glycogen storage capacity and muscle adaptation.		
	Describe the ATP-PC system, its role in providing immediate energy during high-intensity activities, and the regeneration of ATP through phosphocreatine breakdown.		
MICROBIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 07**	
		INTEGRATING DISCIPLINE	**TOPIC**
CFII-Mic-001	Describe the composition and types of culture media (e.g., selective, differential enrichment).	Biochemistry, Microbiology	Culture Media
	Compare and contrast the applications of different culture media in microbiology lab		
CFII-Mic-002	Identify the factors influencing microbial pathogenicity, such as host and immune evasion	Immunology	Pathogenicity of microorganisms
CFII-Mic-003	Summarize the mechanism of action of major classes of chemotherapeutic agents (e.g., B-Lactams, aminoglycosides) Identifying the appropriate chemotherapeutic agent for specific bacterial infections	Pharmacology, Microbiology	Mode of actions of chemotherapeutic agents
CFII-Mic-004	Explain the genetic and biochemical mechanisms of bacterial resistance to antibiotics	Microbiology, Oral Pathology	Mechanism of resistance in bacteria
CFII-Mic-005	Define osteomyelitis. Enlist various osteomyelitis causing Microorganisms		Osteomyelitis
CFII-Mic-006	Discuss Actinomycetes with its epidemiology, virulence factors, pathogenesis		Gram Positive Rods

PHARMACOLOGY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 02	
		INTEGRATING DISCIPLINE	TOPIC
CFII-Ph-001	i. Classify skeletal muscle relaxants according to their mechanism of action. ii. Describe the mechanism of action of non-depolarizing skeletal muscle relaxants. iii. Explain the pharmacological actions of non-depolarizing skeletal muscle relaxant iv. Describe the mechanism of action of succinylcholine. Enumerate therapeutic uses of peripherally acting skeletal muscle relaxants.	Neuro Muscular Blockers	ANS

PHYSIOLOGY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 19	
		INTEGRATING DISCIPLINE	TOPIC
CFII-P-001	Describe the physiological anatomy of a neuron, including its structure and function.	Physiology, Anatomy	Membrane Potentials and Action Potentials (Nerve)
CFII-P-002	Enlist the neuroglia cells responsible for myelination in Central Nervous System (CNS) & Peripheral Nervous System (PNS)	Physiology	Myelinated and Unmyelinated Nerve Fibers.
	Enlist the steps of myelination in peripheral nervous system.		
	Define Multiple sclerosis		
CFII-P-003	Explain Nernst potential of Na & K.		Membrane Potentials
	Derive the Nernst equation.		
	Explain the physiological basis of the Goldman equation and write the equation.		

CFII-P-004	Describe the resting membrane potential of a nerve fiber and the role of various ion channels.		Resting membrane potential
	Discuss Role of different channels in calculating Resting membrane potential of a nerve fiber		
CFII-P-005	Define Action potential and ionic basis.		Action Potentials
	Discuss the role of voltage-gated channels in generating action potentials		
	Define threshold stimulus		
	Define the All-or-None Law. Define absolute refractory period, and relative refractory period also mention their physiological basis		
	Discuss the effects of hypocalcemia on nerve excitability		
	Explain the mechanism of local anesthetics on nerve excitability	Physiology, Pharmacology	
CFII-P-006	Explain the propagation of action potentials	Physiology	Propagation of the action potential
	Define Saltatory conduction and its benefits?		
	Explain mechanism of tetany		
CFII-P-007	Describe the physiological anatomy of skeletal muscles	Physiology, Anatomy	Contraction of Skeletal Muscle
	Describe the structure of Sarcomere	Physiology	
CFII-P-008	Explain general mechanism of skeletal muscle contraction		General mechanism of muscle Contraction
CFII-P-009	Define and differentiate isotonic and isometric contraction with 2 examples of each		Characteristics of whole muscle Contraction
	Give physiological basis of tetanization and multiple fiber summation		
	Define motor unit		
	Give physiological basis of Rigor mortis Explain muscle fatigue	Pathology	

CFII-P-010	Describe the physiological anatomy of Neuro Muscular Junction (NMJ)	Physiology	Neuromuscular Transmission and Excitation-Contraction Coupling
	Explain Mechanism of Neuromuscular transmission & generation of End Plate Potential		
	Give pathophysiology of Myasthenia Gravis	Physiology, Pathology	
CFII-P-011	Differentiate between types of smooth muscles. Give their physiological anatomy	Physiology, Anatomy	Excitation and Contraction of Smooth Muscle
	Describe mechanism of smooth muscle contraction in comparison to skeletal muscle.	Physiology	
	Explain latch phenomenon of smooth muscles and its benefits		

PRACTICALS

ORAL BIOLOGY & TOOTH MORPHOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 06	
		INTEGRATING DISCIPLINE	TOPIC
CFII-OB-005	Draw and label the histological factor of compact and spongy bone	Oral Histology	Bone
CFII-OB-006	Identify and interpret histological sections of bone tissue under a microscope.		Microscopic structure analysis
CFII-OB-007	Analyze and interpret microscopic images of bone to identify its components and features.		Image analysis
CFII-OB-008	Draw & label the histological section of the temporomandibular joint, showing temporal bone, disc, condylar bone, capsule, articular disc, and synovial membrane.	Oral Anatomy	Temporomandibular Joint

ANATOMY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 05	
		INTEGRATING DISCIPLINE	TOPIC

CFII-A-010	Demonstrate the ability to accurately orient a dry human skull in normal verticals, occipitalis, frontalis, lateralis, and basalis views; and identify key anatomical and surface landmarks, sutures, and foramina with their content relevant to each view	Applied Anatomy	Skull
	Identify and describe the anatomical features, boundaries, and foramina of the anterior, middle, and posterior cranial fossae, including the grooves of the dural venous sinuses		
CFII-A-011	Identify and locate the major anatomical landmarks, foramina (with their contents), and surface features of the mandible; articulate it the skull; recognize surrounding anatomical relations (anterior, posterior, medial, and lateral);and demonstrate basic functional mandibular movements and differentiate the role of muscles of Mastication and accessory muscles in protrusion, lateral excursion, opening, and closing.		Mandible
CFII-A-012	Demonstrate and systematically identify major arteries, veins, and nerves on anatomical models or cadaveric dissections; locate their course, branches, and anatomical relations; and correlate their clinical significance with surrounding structures	Applied Anatomy	Surface Anatomy
CFII-A-013	Identify and demonstrate the origin, insertion, nerve supply, and actions of the muscles of mastication and facial expression on models or cadaveric specimens	Applied Anatomy	Jaw Muscle
CFII-A-014	Demonstrate surface marking of extracranial branches of the facial nerve and trigeminal nerve in relation to relevant structures, and identify their anatomical pathways and clinical relevance.	Clinical Anatomy	Neurovascular Supply of face

Module No. 05

NEUROSCIENCES

MODULE RATIONALE

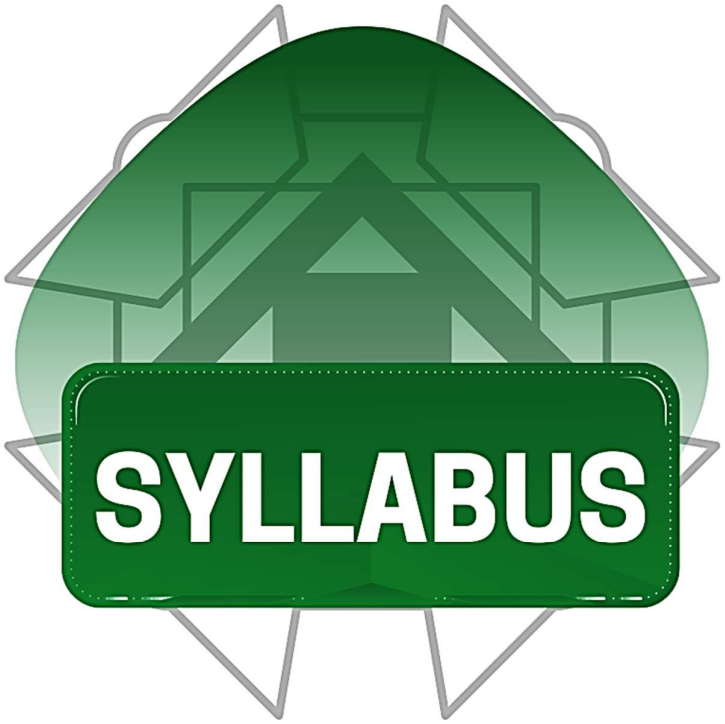
This module aims to provide a thorough understanding of the CNS, including its structure, function, and neurophysiological processes affecting motor and sensory systems. As future dental practitioners, students will learn how to address clinical scenarios involving neurological conditions like trigeminal neuralgia, Bell's palsy, and strokes. The module also covers the pharmacological management of these conditions to ensure safe and effective patient care, especially in those with neurological comorbidities

MODULE OUTCOMES

- Describe the neuroanatomy, histology and microscopic anatomy of central nervous system
- Discuss the physiological mechanism of Autonomic Nervous System (ANS), motor and sensory System
- Explain the underlying pathophysiological mechanisms of common neurological conditions
- Describe the pharmacological principles underlying the management of common neurological conditions

SUBJECTS INTEGRATED IN THE MODULE

- Physiology
- Anatomy
- Biochemistry
- Pharmacology
- Microbiology & Pathology


SYLLABUS

THEORY			
PHYSIOLOGY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 55	
		INTEGRATING DISCIPLINE	TOPIC
NS-P-001	Describe the general organization of nervous system. Classify synapse and explain the physiological anatomy of chemical synapse. Elaborate the role of synapse in processing information. Classify the substances that act as neurotransmitters or synaptic transmitters. Enlist functions related to dentistry of each group.	Physiology	Organization of the Nervous System, Basic Functions of Synapses, and Neurotransmitters
	Define Excitatory and inhibitory postsynaptic potential and explain their mechanism of generation		
	Explain spatial and temporal summation Explain the mechanism of synaptic fatigue (its significance) and synaptic delay Discuss the effects of hypoxia, acidosis and alkalosis on synaptic transmission		
NS-P-002	Define and classify the sensory receptors in the body on the basis of stimuli they detect. Discuss tonic and phasic receptors with 2 to 3 examples of each.		Sensory Receptors, Neuronal Circuits for Processing Information
NS-P-003	Classify the nerve fibers on the basis of diameter and speed of conduction	Physiology	Sensory Receptors Transduction of sensory stimuli into nerve impulses

NS-P-004	Classify somatic sensations. Explain two main ascending pathways (DCML and Anterolateral system) for transmitting sensation to CNS . Enlist sensations carried by dorsal column medial Lemniscal system and Anterolateral Pathway with special reference to Trigeminal sensory system. Trace these pathways from receptors to sensory cortex and compare their features.	Physiology	Somatosensory cortex
	Give location and functions of Primary somesthetic area and sensory association area of sensory cortex. Name the sensations perceived by these areas. Describe the sensations lost when there is damage to somesthetic areas. Discuss representation of body parts in sensory cortex		
NS-P-005	Classify pain. Discuss location and stimulation of pain receptors		Pain, Headache, and Thermal Sensations
	Discuss dual pain pathway of spinal cord and brain for transmission of pain signals into CNS with especial reference to tooth pain compare the features of dual pain pathways		
	Explain Analgesia system/pain suppression system of brain and spinal cord. Discuss its significance		
	Define and give physiological basis of referred pain with two examples. Define Trigeminal Neuralgia and describe its clinical features, basic causes, and dental relevance.		
NS-P-006	Name the motor areas of cerebral cortex and give representation of body parts. Discuss the functions of motor areas	Physiology	Cortical and Brain Stem Control of Motor Function
	Enlist the functions of brain stem		
	Name the descending motor tracts. Describe the functions of corticospinal tract.		
NS-P-007	Give Functional organization of spinal cord. Define motor unit.	Physiology	Spinal Cord Motor Functions;

	Define reflex action and identify the components of a reflex arc. Define, classify and enlist components of stretch reflex with special reference to jaw reflex).		the Cord Reflexes
NS-P-008	Explain the features of upper motor neuron lesion. Explain the features of lower motor neuron lesion. Define and give types of cerebrovascular accident along with their salient features.	Medicine	Effect of Lesions in the Motor Cortex or in the Corticospinal Pathway
NS-P-009	Enlist the components of limbic system and its general functions. Enlist functions of different portions hypothalamus Explain the physiological basis and features of Alzheimer's disease	Physiology	The Limbic System and the Hypothalamus
NS-P-010	Define memory. Classify memory on the basis of duration and information stored. Define retrograde and anterograde amnesia		Memory
NS-P-011	Explain the effects of sympathetic and parasympathetic on various organs/ system of body		The Autonomic Nervous System and the Adrenal Medulla
	Enlist types of autonomic receptors present in heart, blood vessels, smooth muscles, GIT, & EYE. Give features of Alarm or stress response		
NS-P-011	Enlist the functions of CSF Define hydrocephalus		Cerebral circulation
NS-P-012	Give types and features of sleep. Also mention the neurotransmitters involved in sleep		Sleep
NS-P-013	Give functional divisions of cerebellum along with their functions Enlist cerebellar nuclei Enlist features of cerebellar dysfunction	Medicine	Cerebellum and Basal Ganglia Contributions to Overall Motor Control

NS-P-014	Enlist components of basal ganglia in relation to other structures of the brain Discuss functions of basal ganglia Discuss pathophysiology and features of Parkinson's disease. Elaborate the role of Dopamine in basal ganglia	Physiology	Contributions to Overall Motor Control
NS-P-015	Discuss functional anatomy of the eye. Enlist refractive surfaces of the eye and elaborate mechanism of image formation on retina Define cataract and glaucoma		Special senses Optics of the eye Fluid system of the eye—intraocular fluid
NS-P-016	Describe the principal visual pathway from retina to visual cortex. Define the physiological blind spot and describe its location. Explain Pupillary Light Reflex.		Central Neurophysiology of Vision
NS-P-017	Discuss how sound is conducted from tympanic membrane to cochlea? Describe the mechanism of impedance matching and its significance Describe the mechanism of attenuation reflex and its significance		The sense of Hearing Tympanic membrane and the Ossicular system
NS-P-018	Describe the physiological anatomy and function of basilar membrane & organ of corti Give the normal range of frequency for hearing Describe the role of Place principle in determination of sound frequency		Functional anatomy of the cochlea Auditory nervous pathways
NS-P-019	Enlist the primary taste sensations. Describe the physiological anatomy and location of taste buds. Trace the taste pathway		The Chemical Senses—Taste and Smell
	Enlist the primary sensations of smell		

	Describe the physiological anatomy and location of olfactory membrane and olfactory receptors		
GENERAL ANATOMY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 25**	
		INTEGRATING DISCIPLINE	**TOPIC**
NS-A-001	Briefly describe general organization of nervous system	General Anatomy	Nervous System Overview
NS-A-002	Define neuron and describe its structure		Neuron
NS-A-003	Classify neurons morphologically and functionally with examples		Neuron Classification
NS-A-004	Briefly describe components of central and peripheral nervous system		CNS & PNS Overview
NS-A-005	Describe the supporting cells in central and peripheral nervous system		Neuroglia
NS-A-006	Define receptors and effectors		Receptors and Effectors
NS-A-007	Describe classification of receptors		Receptor Classification
NS-A-008	describe the major subdivisions of ANS into sympathetic and parasympathetic nervous system with comparison of anatomical differences.	General Anatomy	Sympathetic vs. Parasympathetic System
NS-A-009	Describe the structural and functional features of cranial nerves.	Neuroanatomy	Cranial Nerves Overview
NS-A-010	Enlist all cranial nerves and describe their functions		Cranial Nerve Functions
NS-A-011	Explain the classification, structure, and functions of peripheral nerve fibers in a typical spinal nerve.		Spinal Nerve Anatomy
NS-A-012	Define dermatome		Dermatome
NS-A-013	Enlist the parts of the brain.		Brain Regions
NS-A-014	Identify the lobes, sulci & gyri and cortical areas of cerebrum		Cerebral Cortex Anatomy

NS-A-015	Describe functional areas of cerebrum		Functional Cortex
NS-A-016	Describe internal structure of cerebral hemisphere (white matter, basal ganglia, lateral ventricle)		Cerebral Hemisphere Structure
NS-A-017	Describe ventricular system (Lateral, 3rd & 4th ventricles)		Ventricular System
NS-A-018	Describe various parts of internal capsule		Internal Capsule
NS-A-019	Label, and identify the key structures in cross-sectional anatomy of the brainstem at the levels of the midbrain, pons, and medulla, highlighting the distribution of grey and white matter.	Neuroanatomy	Brainstem Cross-Sectional Anatomy
NS-A-020	Describe the location of cranial nerve nuclei, their functional components, and distribution, and trace the course of cranial nerve V, VII, VIII, IX, and XII from its intracranial origin to the respective skull foramina.	Neuroanatomy	Cranial Nerve Nuclei and Pathways
NS-A-021	Identify the lobes of cerebellum		Cerebellar Lobes
NS-A-022	Discuss the functional classification of cerebellum		Cerebellar Functions
NS-A-023	Define important clinical correlates, vermis syndrome, ataxia, dysarthria, dysdiadochokinesia, nystagmus, and vertigo.		Cerebellar Clinical Correlates
NS-A-024	Identify the location, extent, coverings, and blood supply of spinal cord		Spinal Cord Overview
NS-A-025	Discuss & tabulate nuclear organization at different levels of spinal cord		Spinal Cord Nuclei
NS-A-026	Describe, draw & label the transverse section of spinal cord at mid cervical level showing ascending & descending tracts		Spinal Cord Cross-Section
NS-A-027	Elaborate the cross-sectional details of white and gray matter of cervical and thoracic segments of spinal cord		Spinal Cord Gray & White Matter
NS-A-028	Tabulate the sensory nerve endings, and anatomical sites of first, second, third order neurons of ascending tracts		Ascending Tracts

NS-A-029	Tabulate first, second, third order neurons of descending tracts		Descending Tracts
NS-A-030	Differentiate clearly between upper and lower motor neuron lesions		UMN vs. LMN Lesions
NS-A-031	Discuss/Draw and label the formation of Circle of Willis		Circle of Willis
NS-A-032	Discuss the location, origin and termination of dural venous sinuses.	Neuroanatomy	Dural Venous Sinuses
NS-A-033	Discuss the important structures associated with the cavernous sinus and its clinical significance in relation to the danger area of the face		Cavernous Sinus
NS-A-034	Discuss the anatomical basis of extradural, subdural and subarachnoid hemorrhages		Intracranial Hemorrhages
NS-A-035	Explain the formation, circulation and absorption of CSF (Cerebrospinal fluid)		CSF Physiology
NS-A-036	Discuss the origin, course, branches and distribution of internal carotid and vertebral artery		Brain Blood Supply
NS-A-037	Basal Reticular System		Reticular System
NS-A-038	Thalamus and hypothalamus in relation to limbic system	Neuroanatomy	Thalamus & Hypothalamus Overview
NS-A-039	Discuss the blood supply, nuclei and major connections of thalamus and hypothalamus		Thalamus & Hypothalamus Connections
	Describe the Hypothalamo-Hypophyseal Portal System		Hypophyseal Portal System
	Discuss the clinical correlates of thalamus and hypothalamus (Thalamic Pain, Thalamic Hand, Diabetes Insipidus)		Thalamic & Hypothalamic Clinical Correlates

BIOCHEMISTRY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 18	
		INTEGRATING DISCIPLINE	TOPIC
NS-B-001	Elaborate the structure of mannitol & give its clinical uses.	Biochemistry	Osmotic diuretic
NS-B-002	Briefly describe the metabolism & importance of glutamine in human body.		Glutamine Metabolism
NS-B-003	Enlist inherited & acquired causes of hyperammonemia. Describe the effects of hyperammonemia on brain. Outline the management options for hyperammonemia.		Hyperammonemia
NS-B-004	Discuss chemistry, sources, RDA, biochemical role, deficiency & toxicity of B1, B6 & B12.		Neuropathies
NS-B-005	Explain the biosynthesis, mechanism of action, and physiological role of acetylcholine, and discuss the clinical consequences of its deficiency		Neurotransmitters
	Outline the reactions involved in biosynthesis of catecholamines. Elaborate the mechanism of action of catecholamines. Give the cause & management of Parkinson disease.		
	Describe the synthesis & biochemical importance of serotonin, melatonin & GABA.		
NS-B-006	Briefly describe the cause, clinical features & management of Phenylketonuria.		Inherited disorders of amino acid metabolism
	Outline the metabolism of branched chain amino acids (BCAA). Briefly describe the cause, clinical features & management of maple syrup urine disease (MSUD).		

PHARMACOLOGY & THERAPEUTICS			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 22	
		INTEGRATING DISCIPLINE	TOPIC
NS-Ph-001	Classify sedative-hypnotics Illustrate GABAA receptor-chloride ion channel macromolecular Complex and identify site of action of various sedative-hypnotics	Pharmacology & Therapeutics	Sedative/Hypnotics
	List their clinical uses and adverse Effects		
	Outline the management of overdose of sedative-hypnotics		
	Compare BZD, barbiturates; and BZD, Buspirone Identify the distinctive properties of buspirone, eszopiclone, ramelteon, zaleplon, zolpidem and suvorexant		
NS-Ph-002	Classify local anesthetics Describe their mechanism of action Outline various methods of giving local anesthesia		Local Anesthetics
	Explain the relationship among tissue pH, drug pKa, and the rate of onset of local anesthetic action Discuss 4 factors that determine the susceptibility of nerve fibers to local anesthetic blockade		
	Describe the major toxic effects of the local anesthetics Explain how hyperkalemia facilitates the cardiac toxicity of local anesthetics		
NS-Ph-003	Name the major inhalation and intravenous anesthetic drugs.		General Anesthetics
	Define the terms blood:gas partition coefficient and minimum alveolar concentration (MAC), and explain their significance in the pharmacology of inhalational anesthetics.		

	Enlist the molecular targets of action of anesthetic drugs and describe their associated toxicities.		
	List main pharmacokinetic characteristics of commonly used intravenous and inhaled anesthetic agents.		
NS-Ph-004	Write pharmacodynamic classification of Opioid analgesics. Identify 3 opioid receptor subtypes and describe ionic mechanisms that result from their activation.		Opioid Analgesics
	Describe cardinal signs and treatment of opioid drug overdose and of the withdrawal syndrome.		
	Describe the classification, mechanism of action, therapeutic uses, and adverse effects of opioid analgesics.		
NS-Ph-005	Classify antiseizure drugs List the drugs of choice for partial seizures, generalized tonic-clonic seizures, absence and myoclonic seizures, and status epilepticus		Antiseizure drugs
	Identify the mechanisms of antiseizure drug action at the levels of specific ion channels and/or neurotransmitter systems Highlight the uses, adverse effects and drug interactions of carbamazepine, phenytoin, and valproic acid		
	Identify the distinctive toxicities of new antiseizure drugs Outline the management of status epilepticus		
NS-Ph-006	Enlist types and sub types of various ANS receptors along with their locations in different structures and organ systems of the body		Introduction to ANS
	Describe the synthesis, storage, release and degradation of the neuro-transmitters of the ANS Explain the negative and positive feedback controls of neurotransmitter release		

NS-Ph-007	Classify cholinomimetics according to chemistry & mechanism of action. Describe actions of acetylcholine on different organ systems of body. Enumerate the adverse effects of acetylcholine & cholinergic drugs		Cholinergic Drugs (agonists)
	Explain the salient pharmacological properties of cholinesterases with their appropriate clinical uses. Differentiate between cholinergic and myasthenic crisis Describe the management of myasthenia gravis. Explain the role of Pilocarpine in glaucoma		
	Enumerate the signs and symptoms of organophosphate poisoning due to cholinergic excess. Enlist steps in the management of organophosphate Compound (OPC) poisoning Describe aging and role of oximes in the management. Explain the prevention of OPC poisoning		
	Classify anti-cholinergic drugs (on the basis of therapeutic uses) Describe pharmacological actions of atropine		
	Differentiate between atropine and hyoscine Enlist therapeutic uses of atropine Enumerate adverse effects of anti-cholinergic drugs		
NS-Ph-008	Classify skeletal muscle relaxants according to their mechanism of action. Describe mechanism of action and adverse effects of non-depolarizing skeletal muscle relaxants		Skeletal Muscle Relaxants
	Describe mechanism of action and adverse effects of depolarizing skeletal muscle relaxants. Enumerate therapeutic uses of peripherally acting skeletal muscle relaxants. Define and give pharmacological basis and treatment of malignant hyperthermia		

NS-Ph-009	Classify sympathomimetics on the basis of chemistry & receptor selectivity. Explain the mechanism of action of adrenaline, the prototype drug of the group. Describe the important pharmacological actions of adrenaline on different organ systems of the body. Enlist and explain the therapeutic uses of adrenaline		Sympathomimetic Drugs
	Enumerate important adverse effects& contraindications of the drug. Explain the differences in response, therapeutic uses& side-effects of other catecholamines with reference to adrenaline Differentiate between catecholamines and non-catecholamines		
	Explain the pharmacological actions of important non-catecholamines in light of their mode of action Enlist important therapeutic uses and side-effects of important non-catecholamines. Classify sympathomimetics according to their clinical indications		
NS-Ph-010	Classify alpha blockers according to receptor selectivity. Explain the pharmacological actions of alpha blockers		Alpha Receptor Blocking drugs
	Enlist and important clinical uses and side-effects of this drug group. Describe their role in benign prostatic hyperplasia & pheochromocytoma		
NS-Ph-011	Classify beta blockers according to receptor selectivity, ISA, MSA, lipid solubility & duration of action. Describe the pharmacological actions of beta blockers on different systems of the body.		Beta Receptor Blocking drugs
	Explain important pharmacokinetic features of the group		

	Enlist and explain important clinical uses of beta blockers especially with reference to CVS		
	Enlist non-cardiac clinical uses of beta blockers Enlist important side effects and contraindications of beta blockers		
NS-Ph-012	Name central Sympathoplegics and centrally acting alpha-2 agonists. Explain mechanism of action, uses and side effects of alpha methyl Dopa & clonidine Differentiate between alpha methyl Dopa & clonidine		Centrally Acting Sympathoplegic Drugs
PATHOLOGY & MICROBIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 17**	
		INTEGRATING DISCIPLINE	**TOPIC**
NS-Pa-001	Define meningitis. Identify different types of meningitis according to etiology.	Pathology	Infections of CNS (meninges)
NS-Pa-002	Define concussion and contusion Enlist their clinical features		Trauma to CNS
NS-Pa-003	Enumerate various demyelinating diseases of CNS Enlist clinical features and diagnosis of Multiple Sclerosis & Guillain-Barre syndrome		Demyelinating diseases of CNS
NS-Pa-004	Introduction to viruses, structure of virus, classification of DNA and RNA viruses		Viruses
NS-Pa-005	Discuss herpes simplex virus with its epidemiology, virulence factors, pathogenesis, lab diagnosis & prevention.		Herpes Simplex Virus infection related to CNS
NS-Pa-006	Discuss varicella zoster virus with its epidemiology, virulence factors, pathogenesis, lab diagnosis & prevention.		Varicella Zoster Virus infection related to CNS

NS-Pa-007	Discuss Polio virus with its virulence factors, pathogenesis, lab diagnosis & prevention		Polio virus infections
NS-Pa-008	Discuss Clostridium tetani and Clostridium botulinum with its virulence factors, pathogenesis, lab diagnosis		Clostridium tetani & Clostridium botulinum infections

PRACTICALS

PHYSIOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 13	
		INTEGRATING DISCIPLINE	TOPIC
NS-P-022	Examination of Olfactory nerve	Physiology	Sensory System
NS-P-023	Examination of 3rd, 4th and 6th nerve		CN III, IV, VI
NS-P-024	Examination of trigeminal nerve		CN V
NS-P-025	Examination of facial nerve		CN VII
NS-P-026	Examination of 9th, 10th, 11th & 12th nerve		CN IX, X, XI, XII
NS-P-027	Demonstrate following superficial reflexes: Corneal Reflex, Conjunctival Reflex & Plantar reflex.		Motor System
NS-P-028	Examination of Deep tendon reflexes		Deep Reflexes
NS-P-029	Recording body temperature		Hypothalamus

NEUROANATOMY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 04	
		INTEGRATING DISCIPLINE	TOPIC

NS-A-040	Demonstrate gross neuroanatomical knowledge of the brain and brainstem with particular focus on the cranial nerves, including identification of their origin, course, nuclei, associated foramina, functional components, and clinical correlations using anatomical models and dissected cadaveric specimens	Neuroanatomy	Nervous system

Module No. 06

ALVEO-CEMENTAL COMPLEX

MODULE RATIONALE

The alveo-cemental complex comprises critical structures including the periodontal ligament (PDL), cementum, alveolar bone, gingiva, and the physiological processes of tooth eruption and shedding. Understanding these components is essential for dental students to grasp the structural, functional, and dynamic aspects of periodontal health and disease. By focusing on these elements collectively, this module provides a comprehensive view of the interrelationship between the periodontal tissues, their roles in maintaining oral health, and their response to pathological changes.

The alveo-cemental complex module is a vital component of the oral histology curriculum, providing dental students with an in-depth understanding of the tissues that form the periodontium and their functional interrelationships. By linking histological features to clinical applications, this module ensures students develop the foundational knowledge required to excel in their dental education and future clinical practice. This holistic approach fosters critical thinking and prepares students to diagnose and manage periodontal conditions effectively.

MODULE OUTCOMES

- Knowledge-Based Learning Outcomes: Describe the histological features, composition, and structural organization of the periodontal ligament (PDL), cementum, alveolar bone, and gingiva.
- Explain the functional roles of each component in the alveo-cemental complex in maintaining tooth support and stability.
- Identify the adaptive and regenerative capacities of periodontal tissues, including bone remodeling and cementum deposition.
- Skill-Based Learning Outcomes: Analyze histological slides of the PDL, cementum, alveolar bone, and gingiva to identify their structural features and clinical relevance.
- Attitude-Based Learning Outcomes: Appreciate the complexity and interdependence of the alveo-cemental complex in maintaining oral health.
- Demonstrate an understanding of the importance of histological knowledge in diagnosing and managing periodontal and developmental conditions.
- Develop an awareness of the role of scientific inquiry in advancing knowledge of periodontal tissue biology and its applications in dentistry.

SUBJECTS INTEGRATED IN THE MODULE

- Oral Biology & Tooth Morphology
- Community Dentistry
- Dental Radiology

- Periodontology
- Pathology


SYLLABUS

THEORY			
ORAL BIOLOGY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 13	
		INTEGRATING DISCIPLINE	TOPIC
ALC-OB-001	Define the alveolo-cemental complex (periodontium) and explain its role in dental support.	Oral Histology	Periodontium Overview
ALC-OB-002	Identify its components (cementum, PDL, alveolar bone, gingiva) and their diagrammatic arrangement around the tooth.		Components of Periodontium
ALC-OB-003	Recognize and define key terms (e.g., cementoid, Sharpey's fibers, proprioception) related to alveolo-cemental complex		Periodontium Terminology
ALC-OB-004	Discuss the development of Supporting Tissues		Development of Supporting Tissues
ALC-OB-005	Enlist the structure and function of the periodontal ligament.		Periodontal Ligament Structure
ALC-OB-006	Describe the different groups of fibers in the periodontal ligament.		Periodontal Ligament Fiber Groups
ALC-OB-007	Describe the adaptation of the periodontal ligament to the functional demands.		Functional Adaptation of Periodontal Ligament
ALC-OB-008	Relate the study of the periodontal ligament with developmental disturbances and clinical implications.		Periodontal Ligament Clinical Relevance
ALC-OB-009	Differentiate between the structure of cellular and acellular cementum.		Cellular vs Acellular Cementum
ALC-OB-010	Classify and explain the structure of different types of cementum and their properties.		Types of Cementum

ALC-OB-011	Describe the role of cementum in the attachment apparatus.	Oral Histology	Cementum in Attachment Apparatus
ALC-OB-012	Describe resorption and repair of cementum and age changes.		Cementum Resorption and Repair
ALC-OB-013	Relate the study of cementum with developmental disturbances and clinical implications.		Cementum Clinical Relevance
ALC-OB-014	Describe the histology of bone cells and their molecular regulation.		Bone Cells and Molecular Regulation
ALC-OB-015	Describe the structure and functions of alveolar bone.		Alveolar Bone Structure and Function
ALC-OB-016	Elaborate its changes with age and its clinical considerations.		Alveolar Bone Age Changes and Clinical Relevance
ALC-OB-017	Describe the histological aspects of gingiva.		Gingival Histology
ALC-OB-018	Enumerate gingival fibers & their functions.		Gingival Fibers
ALC-OB-019	Tabulate blood and nerve supply of gingiva.		Gingival Blood and Nerve Supply
ALC-OB-020	Describe the structural and functional characteristics of different areas of Gingival epithelium		Gingival Epithelium
ALC-OB-021	Explain the structure of dentogingival junction.		Dentogingival Junction
ALC-OB-022	Explain the structure of mucogingival junction.		Mucogingival Junction
ALC-OB-023	Describe eruption and phases of tooth movement.		Tooth Eruption Phases
ALC-OB-024	Elaborate pre-eruptive tooth movement.		Pre-eruptive Tooth Movement
ALC-OB-025	Discuss the mechanism and factors responsible for eruptive tooth movement.		Eruptive Tooth Movement Mechanisms
ALC-OB-026	Describe the types of movement a tooth makes post-eruption to maintain its functional position in the jaw in terms of mechanism and significance.		Post-eruptive Tooth Movements

ALC-OB-027	Discuss histology and causes of tooth shedding.	Oral Histology	Tooth Shedding
ALC-OB-028	Describe the factors involved in abnormal tooth movement.		Abnormal Tooth Movements
ALC-OB-029	Describe modeling and remodeling of bone.		Bone Modeling and Remodeling
ALC-OB-030	Explain orthodontic tooth movement.		Orthodontic Tooth Movement
ALC-OB-031	Describe the investing layer associated with the crowns of unerupted teeth.	Orthodontics	Investing Layer of Unerupted Teeth
ALC-OB-032	Define the alveolo-cemental complex (periodontium) and explain its role in dental support.	Oral Histology	Periodontium Overview
COMMUNITY DENTISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 03**	
		INTEGRATING DISCIPLINE	**TOPIC**
ALC-CD-001	Define the key periodontal indices used in epidemiological studies, including indices for gingivitis, periodontitis, and plaque assessment.	Community Dentistry	Periodontal Indices
ALC-CD-002	Explain the principles and methodology for measuring periodontal diseases in population-based studies.		Periodontal Indices
ALC-CD-003	Describe various indices used for measuring gingivitis (e.g., Löe & Silness Gingival Index) and their significance in assessing community oral health.		Gingivitis Indices in Community Health
ALC-CD-004	Discuss the different periodontitis measurement methods, including the Community Periodontal Index (CPI) and clinical attachment loss (CAL).		Periodontitis Measurement Methods

DENTAL RADIOLOGY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 03	
		INTEGRATING DISCIPLINE	TOPIC
ALC-DR-001	Define the role of radiology in diagnosing and assessing periodontal diseases.	Dental Radiology	Role of Radiology in Periodontal Disease Diagnosis
ALC-DR-002	Explain the radiographic features of healthy periodontium and pathological changes seen in gingivitis and periodontitis.		Radiographic Features of Health and Disease
ALC-DR-003	Interpret key radiographic signs of periodontal disease, including crestal bone loss, widening of the periodontal ligament space, and calculus deposits.		Interpretation of Radiographic Signs in Periodontal Disease
PERIODONTOLOGY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 03	
		INTEGRATING DISCIPLINE	TOPIC
ALC-OP-001	Define key terminologies related to periodontal diseases: Gingivitis, periodontitis, periodontal pockets, clinical attachment level and periodontal bone loss	Oral Pathology and Periodontology	Periodontal Disease Terminology
ALC-OP-002	Identify the microbial composition of healthy gingival and periodontal tissues. Explain the role of commensal bacteria in maintaining periodontal homeostasis.		Healthy Microbial Composition and Periodontal Homeostasis
ALC-OP-003	List key bacterial species involved in periodontal disease (e.g., Porphyromonas gingivalis, Tannerella forsythia, Treponema denticola).		Pathogenic Bacterial Species in Periodontal Disease

ALC-OP-004	Explain how bacterial enzymes, toxins, and metabolic byproducts contribute to tissue destruction.		Role of Bacterial Enzymes and Toxins in Tissue Destruction
ALC-OP-005	What is Plaque biofilm and how is it form and what is its role in periodontal diseases.		Plaque Biofilm Formation and Role in Disease
ALC-OP-006	Describe dental plaque biofilm as the major factor contributing to development of periodontal disease, and its relationship with host, genetic and local predisposing factors in exacerbating periodontal conditions.		Biofilm-Host Interaction and Risk Factors
ALC-OP-007	Demonstrate the adherent nature of plaque and the inability to visualize easily. Describe why it is important to disclose plaque; and demonstrate the need for mechanical plaque removal both by the patient and professionally.	Oral Pathology and Periodontology	Plaque Visualization, Disclosure, and Mechanical Removal
ALC-OP-008	Explain the role of dental calculus in periodontal disease, differentiate between supragingival and subgingival calculus, describe the formation, mineralization, and microbial composition of calculus, and explain how calculus acts as a plaque-retentive surface contributing to periodontal disease progression.		Dental Calculus Formation, Composition, and Role in Disease
ALC-OP-009	Enlist other predisposing factors (other than calculus) that predispose to plaque formation and consequent periodontal disease like gingivitis.		Other Predisposing Factors for Plaque Formation
ALC-OP-010	Describe the etiology and pathogenesis of scurvy with emphasis on the biochemical role of Vitamin C in collagen synthesis and its clinical implications on periodontal tissue integrity		Scurvy and Vitamin C Role in Periodontal Health
PATHOLOGY-IMMUNOLOGY BASICS			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 08**	

		INTEGRATING DISCIPLINE	TOPIC
ALC-Pa-001	Define acute inflammation and its pathological basis relevant to dental conditions.	Pathology and Immunology	Acute Inflammation in Dental Conditions
ALC-Pa-002	Enlist stimuli for acute inflammation, including microbes, trauma, and chemical irritants relevant to oral infections.		Stimuli of Acute Inflammation in Oral Health
ALC-Pa-003	Classify chemical mediators of acute inflammation and their role in dental diseases such as dental abscess formation.		Chemical Mediators of Acute Inflammation in Dentistry
ALC-Pa-004	Explain vascular and cellular events in acute inflammation and its relation to dental conditions like pulpitis and periodontitis.	Pathology and Immunology	Vascular and Cellular Events in Acute Inflammation
ALC-Pa-005	Describe systemic effects of acute inflammation, such as fever and leukocytosis, and their impact on dental treatment.		Systemic Effects of Acute Inflammation
ALC-Pa-006	Recognize microbes causing acute inflammation in dental infections like Streptococcus mutans and Porphyromonas gingivalis.		Microbes Causing Dental Infections
ALC-Pa-007	Analyze morphological patterns of acute inflammation, such as purulent or fibrinous types, in oral diseases.		Morphological Patterns of Acute Inflammation in Oral Diseases
ALC-Pa-008	Define chronic inflammation and its significance in persistent oral and systemic conditions.		Chronic Inflammation and Its Oral/Systemic Significance
ALC-Pa-009	Identify chronic inflammatory cells, such as macrophages and lymphocytes, and mediators like TNF-α and IL-1.		Chronic Inflammatory Cells and Mediators
ALC-Pa-010	Discuss Porphyromonas and Fusobacterium with its pathogenesis.		Pathogenesis of

			Porphyromonas and Fusobacterium
PRACTICALS			
ORAL BIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 07**	
		INTEGRATING DISCIPLINE	**TOPIC**
ALC-OB-033	Draw and label the periodontal ligament in a cross-section between teeth.	Oral Biology	Periodontal Ligament Cross-Section
ALC-OB-034	Draw and label the arrangement of principal fiber groups within the periodontium.		Principal Fiber Groups Arrangement
ALC-OB-035	Draw and label the differentiation of cementoblasts from ectomesenchymal cells & the fragmentation of Hertwig's epithelial root sheath.		Cementoblast Differentiation and HERS Fragmentation
ALC-OB-036	Draw and label the cementoenamel junction.		Cementoenamel Junction
ALC-OB-037	Draw and label cellular cementum.		Cellular Cementum
ALC-OB-038	Draw and label alveolar bone and bundle bone.		Alveolar and Bundle Bone
ALC-OB-039	Draw and label different anatomical zones of gingiva; mucocutaneous junction, mucogingival junction, dentogingival junction & gingival group of fibers (gingival ligament).		Anatomical Zones of Gingiva and Gingival Fibers
DENTAL RADIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 03**	
		INTEGRATING DISCIPLINE	**TOPIC**
ALC-DR-004	Identify normal periodontal structures on radiographs (OPG and periapical).	Dental Radiology	Normal Periodontal Structures on Radiographs

ALC-DR-005	Observe alveolar bone and assess bone levels.	Dental Radiology	Alveolar Bone Observation and Level Assessment
ALC-DR-006	Identify the periodontal ligament (PDL) space on radiographs.	Dental Radiology	Periodontal Ligament Space Identification
ALC-DR-007	Identify the lamina dura on radiographs.	Dental Radiology	Lamina Dura Identification
ALC-DR-008	Recognize the cementoenamel junction (CEJ) on radiographs.	Dental Radiology	Cementoenamel Junction Recognition
ALC-DR-009	Differentiate between cortical and cancellous bone on radiographs.	Dental Radiology	Cortical vs. Cancellous Bone Differentiation
PERIODONTOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 03**	
		INTEGRATING DISCIPLINE	**TOPIC**
ALC-OP-011	Demonstrate plaque disclosure and visualization techniques.	Periodontology	Plaque Disclosure and Visualization
ALC-OP-012	Record plaque index using standard methods.		Plaque Index Recording
ALC-OP-013	Demonstrate plaque removal techniques including proper brushing and flossing.		Brushing and Flossing Techniques
ALC-OP-014	Observe professional plaque removal techniques including scaling (formative observation only, not assessed).		Professional Plaque Removal Observation
PATHOLOGY IMMUNOLOGY BASICS			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 03**	
		INTEGRATING DISCIPLINE	**TOPIC**
ALC-Pa-011	Identify histological slides of acute inflammation.	Pathology and Immunology	Histological Identification

			of Acute Inflammation
ALC-Pa-012	Perform a clinical examination to detect signs of acute inflammation.		Clinical Examination for Acute Inflammation
ALC-Pa-013	Distinguish between granulomatous and non-granulomatous inflammation in histological slides.		Differentiation of Granulomatous and Non-Granulomatous Inflammation
ALC-Pa-014	Identify clinical signs of chronic inflammation such as ulcers, gingival swelling, and oral lesions.		Clinical Identification of Chronic Inflammation Signs
COMMUNITY DENTISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	
		INTEGRATING DISCIPLINE	**TOPIC**
ALC-CD-005	CPITN	Community Dentistry	Indices in Community dentistry

BDS Integrated Curriculum 2K25

Version 01

BLOCK 03

YEAR-01

Module No. 07
BLOOD & CARDIOVASCULAR SYSTEM

MODULE RATIONALE

The Blood and Cardiovascular System (CVS) module is a vital component of the Biological Basis of Health & Disease in the dental curriculum. Blood and CVS are essential for maintaining systemic equilibrium and have direct implications for oral health, wound healing, and comprehensive patient care in dentistry.

It is important to highlight that the structure, function, and clinical aspects of Red Blood Cells (RBCs) were thoroughly covered in the Foundation Module, while the Introduction to Inflammation was previously explored in the Alveolo-cemental Module. Inflammation will now be studied in detail in this module, with a focus on cellular and molecular mechanisms, clinical manifestations, and relevance to systemic and oral disease processes.

This current module builds upon those themes by exploring the remaining components of blood—such as white blood cells, platelets, plasma proteins, immunity, hemostasis, and blood groups—as well as the anatomy and physiology of the heart and vasculature, key pathologies, and relevant pharmacological interventions.

A unique feature of this block is the addition of upper limb anatomy, specifically tailored to support intravenous cannulation skills. This enhancement is aimed at building essential clinical competencies in dental students for managing medical emergencies and improving their understanding of vascular access.

This module is designed in a fully integrated format, where Anatomy, Biochemistry, Physiology, Pathology & Microbiology, and Pharmacology come together to deliver cohesive and clinically contextual knowledge.

Clinical Relevance to Dentistry

Understanding the Blood and Cardiovascular System is indispensable in dental practice due to its widespread influence on diagnosis, treatment planning, and patient safety. Key relevance areas include:

- Hemostasis and Coagulation: Essential for managing dental extractions, periodontal surgeries, and post-operative care, especially in patients with bleeding disorders.
- Infective Endocarditis: Recognizing cardiac risk factors and implementing prophylactic strategies during invasive procedures is critical.
- Anemia and Systemic Conditions: Oral manifestations of systemic diseases, such as pallor, glossitis, or delayed healing, are frequently encountered in dental settings.
- Hypertension and Cardiovascular Diseases: Common comorbidities that affect the choice of anesthetic agents, treatment timing, and stress management.
- Drug Interactions: Familiarity with cardiovascular pharmacology aids in safely managing patients on anticoagulants, antihypertensives, or antiplatelet agents.

• Inflammatory and Immune Responses: Integral to the pathogenesis of periodontal disease, periapical infections, and oral ulcers. The study of anti-inflammatory diseases enhances understanding of chronic immune modulation in oral and systemic health.

• Emergency Preparedness: Knowledge of vascular anatomy, including the upper limb, underpins emergency response skills such as intravenous access, medication administration, and cardiopulmonary resuscitation (CPR).

This module aims to build a foundation of knowledge that enables students to relate systemic pathophysiology to oral findings and make informed, safe decisions in their future dental practice.

MODULE OUTCOMES

- Blood and Immune System: Describe the composition and functions of blood, including plasma, red and white blood cells, and platelets.
- Explain the process of hematopoiesis and the regulation of blood cell production.
- Interpret normal and abnormal complete blood count (CBC) and relate findings to clinical conditions.
- Discuss the role and types of white blood cells in innate and adaptive immunity.
- Explain the physiological mechanisms of hemostasis, coagulation, fibrinolysis, and the role of antifibrinolytic agents in controlling bleeding.
- Identify common bleeding and clotting disorders and describe their relevance to dental procedures.
- Classify blood groups and explain their importance in transfusion medicine and emergency care.
- Describe the cellular and molecular basis of inflammation and distinguish between acute and chronic inflammation.
- Discuss the systemic and oral manifestations of inflammatory and anti-inflammatory diseases.
- Correlate laboratory markers of inflammation (e.g., CRP, ESR) with underlying pathology in dental practice.
- Identify key pharmacological agents related to the blood and immune systems, including:
- Antiplatelet and anticoagulant drugs (e.g., aspirin, heparin, warfarin, DOACs)
- Antifibrinolytics (e.g., tranexamic acid), especially in managing bleeding risks during dental procedures
- Immunosuppressive agents used in inflammatory and autoimmune conditions
- Corticosteroids and NSAIDs: their mechanisms, uses, and considerations in dental care
- Therapies for anemia (e.g., iron, folate, vitamin B12, erythropoietin)
- Discuss drug-related complications and interactions that may affect dental treatment, particularly in patients receiving systemic therapies affecting hemostasis and immunity.
- Describe the gross, microscopic, and functional physiological anatomy of the heart, blood vessels, and lymphatics, with a focus on their relevance to oral tissues.

- Explain the physiology of the cardiac cycle, including electrical conduction, heart sounds, and mechanical events.
- Understand blood pressure regulation and homeostasis, and identify normal and abnormal values.
- Discuss the pathophysiology of common cardiovascular diseases, including hypertension, atherosclerosis, and heart failure.
- Describe dental management considerations for patients with cardiovascular conditions, including antibiotic prophylaxis and emergency response.
- Identify and explain the pharmacological agents used in cardiovascular medicine, including:
- Antihypertensives (e.g., beta-blockers, ACE inhibitors, calcium channel blockers, diuretics)
- Antianginal and antiarrhythmic drugs
- Lipid-lowering agents (e.g., statins)
- Emergency cardiovascular drugs (e.g., adrenaline, glyceryl trinitrate)
- Evaluate the dental implications of cardiovascular medications, including side effects such as xerostomia, gingival hyperplasia, and increased bleeding risk.
- Recognize oral manifestations of cardiovascular diseases and correlate them with systemic conditions.
- Demonstrate anatomical knowledge of the upper limb venous system to support the development of intravenous cannulation skills.
- Apply integrated understanding of CVS in interpreting ECG basics, measuring blood pressure, and assessing cardiovascular risks in dental patients.
- Reflect on the significance of cardiovascular health in maintaining oral health and ensuring safe, patient-centered dental care.

SUBJECTS INTEGRATED IN THE MODULE

- Anatomy
- Biochemistry
- Physiology
- Pathology
- Pharmacology


SYLLABUS

THEORY			
ANATOMY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 13	
		INTEGRATING DISCIPLINE	TOPIC
CVS-A-001	Describe the Blood components Describe the structure of heart wall and functioning of heart Classify and exemplify various types of blood vessels Describe and exemplify various types of anastomoses Describe three circulatory routes Define portal system and describe its two varieties Describe the vascular supply of blood vessels Describe various components of lymph vascular system	General Anatomy	Circulatory system
CVS-A-002	Describe the boundaries and contents of cubital fossa Describe the clinical significance of cubital fossa: taking blood pressure and collecting blood sample	Gross Anatomy	Phlebotomy
CVS-A-003	Describe the superficial veins, muscles, nerves and vessels of flexor/anterior compartment of forearm Describe the clinical significance of median forearm vein.	Gross Anatomy	Phlebotomy

CVS-A-004	Describe the superficial veins, muscles, tendons, vessels and nerves of dorsum of hand Describe the boundaries, contents and clinical importance of anatomical snuff box. Describe the clinical importance of dorsal venous arch, cephalic and basilic veins	Gross Anatomy	Phlebotomy
BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 13**	
		INTEGRATING DISCIPLINE	**TOPIC**
CVS-B-001	Define Zwitter ion and isoelectric pH.	Biochemistry	Chemistry and classification of amino acids
CVS-B-002	Define limiting amino acids and provide suitable examples of limiting amino acids.		Classification of proteins
CVS-B-003	Understand the nutritional importance of proteins and correlate this information to protein energy malnutrition. Compare and contrast the salient features of kwashiorkor and marasmus.	Pediatric dentistry	Protein energy malnutrition (PEM)
CVS-B-004	Define conjugated proteins and provide suitable examples of conjugated proteins in the human body (lipoproteins, glycoproteins, nucleoproteins, chromoproteins, and metalloproteins).	Oral pathology	Conjugated proteins
CVS-B-005	Elaborate the role of chaperones in protein folding.	Periodontology	Structural organization of proteins

CVS-B-006	Briefly describe the consequences of protein misfolding (Alzheimer's disease and prion diseases).	Gen Medicine	Protein misfolding
CVS-B-007	Differentiate between denaturation and coagulation.	Immunology	Protein Structure and Denaturation
CVS-B-008	Enlist the functions and give the clinical importance of plasma proteins (albumin, fibrinogen, and transferrin).	Physiology, Gen Pathology Gen Medicine	Plasma proteins
CVS-B-009	Draw and label the general structure of an antibody. Enlist five major types of immunoglobulins and give functions/significance of each class separately.	Immunology	Immunoglobulin Classes and Their Functions
CVS-B-010	Explain the process of beta-oxidation of fatty acids and how it contributes to ATP production during sustained, low-intensity exercise.	Bichemistry	Lipid metabolism
CVS-B-011	Define eicosanoids. Outline classification and biomedical importance of eicosanoids. Enlist functions of prostaglandins, leukotrienes and thromboxanes. Explain how low-dose aspirin therapy helps in the management of patients with IHD.	Physiology, Pathology, Pharmacology, Gen Medicine	Eicosanoids
PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 20**	
		INTEGRATING DISCIPLINE	**TOPIC**
BLOOD			

CVS-P-001	Enumerate the types of white blood cells along with their normal blood count. Discuss their site of genesis.		Resistance of the Body to Infection: I. Leukocytes, Granulocytes, the Monocyte-Macrophage System, and Inflammation
CVS-P-002	Describe the characteristics and functions of Neutrophils Explain the process of phagocytosis and lysis of invading agent by neutrophils	Pathology Immunology	Resistance of the Body to Infection: I. Leukocytes, Granulocytes, the Monocyte-Macrophage System, and Inflammation
	Explain the process of phagocytosis and lysis of invading agent by macrophages		
	Explain the process of opsonization		
	Describe the process of inflammation		
	Enlist different lines of defense during inflammation		
CVS-P-003	Explain the process of Migration of neutrophils from the blood into inflamed tissue		Resistance of the Body to Infection: I. Leukocytes, Granulocytes, the Monocyte-Macrophage System, and Inflammation
	Explain the functions of eosinophils and basophils		
	Give normal lifespan of white blood cells		
CVS-P-004	Classify lymphocytes		Resistance of the Body to Infection:

	Classify T lymphocytes and enlist their salient functions Define immunity Describe innate immunity Describe and classify acquired immunity Define passive immunity		II. Immunity and Allergy
CVS-P-005	Discuss the role of T cells and B cells in acquired immunity Define plasma cells	Pathology Immunology	Specific attributes of the B-lymphocyte system—humoral immunity and antibodies
	Describe the structure of antigen and immunoglobulin. Enlist types of immunoglobulins Describe the mechanism of direct action of antibodies		
CVS-P-006	Enumerate different blood group types. Explain the basis of ABO and Rh blood system	Pathology Haematology	Blood Types; Transfusion
	Discuss the features and complications of mismatched blood transfusion reaction Enlist the Hazards of blood transfusion.		
	Discuss the pathophysiology, features and treatment of Rh incompatibility.	Physiology	
CVS-P-007	Define hemostasis. Enlist and explain the mechanisms that secure hemostasis Give characteristics and functions of platelets.		Hemostasis and Blood Coagulation

	Mention normal platelet count in blood and life span of platelets		
	Explain the steps involved in formation of primary platelet plug to seal small vascular holes Define thrombocytopenia. Enlist causes of thrombocytopenia Explain consequences of thrombocytopenia		
	Enlist the clotting factors in blood. Name vitamin K dependent clotting factors		
	Explain the Intrinsic & extrinsic clotting pathway. Describe mechanism of clot formation after injury		
	Name and give mechanism of anticoagulants (heparin, oxalate & citrate) used in laboratory.		
CVS-P-008	Enlist and explain the conditions that cause excessive bleeding (Vitamin K deficiency, Hemophilia, Thrombocytopenia)		Conditions that cause excessive bleeding in humans
	Define Prothrombin time and mention its significance		
HEART			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 11**	
		INTEGRATING DISCIPLINE	**TOPIC**
CVS-P-009	Explain the physiological anatomy of cardiac muscle.	Anatomy	Cardiac Muscle; The Heart as a Pump and Function of the Heart Valves
	Describe and draw the phases of action potential of ventricle		

CVS-P-010	Describe and draw the phases of action potential of SA node along with explanation of the mechanism of self-excitation/ Auto rhythmicity of SA node.	Anatomy	Rhythmical Excitation of the Heart
	Draw and explain the conducting system of heart	Anatomy	
CVS-P-011	Describe the mechanism of excitation-contraction coupling in cardiac muscle.		Cardiac Muscle; The Heart as a Pump and Function of the Heart Valves
	Draw & explain pressure & volume changes of left ventricle during cardiac cycle.		
	Define & give the normal values of the cardiac output, stroke volume, end diastolic volume, end systolic volume and venous return		
	Describe the Frank starling mechanism. Describe the autonomic regulation of heart pumping. Describe the effect of potassium, calcium ions & temperature on heart function.		
CVS-P-012	Define Electrocardiogram Enlist, draw, and explain the physiological basis & give durations of waves, intervals, and segments of normal ECG.	General Medicine	Fundamentals of Electrocardiography
CVS-P-013	Define tachycardia and enlist its causes. Define bradycardia and enlist its causes.		Cardiac Arrhythmias
	Define sinus arrhythmia and its physiological basis		
CIRCULATION			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 15**	
		INTEGRATING DISCIPLINE	**TOPIC**
CVS-P-014	Explain the functional parts of circulation (arteries, arterioles, capillaries, veins, venules)	Anatomy/Oral Medicine	Overview of the Circulation Nervous Regulation of

	Mention the pressures in systemic & pulmonary circulation. Describe nervous regulation of blood vessels and functioning of vasomotor centers. Explain vasovagal syncope		the Circulation
CVS-P-015	Identify vessels constituting microcirculation. Enumerate starling forces (hydrostatic and osmotic forces) and explain their role in capillary filtration and formation of interstitial fluid. Define edema	Physiology	The Microcirculation and Lymphatic System: Capillary Fluid Exchange, Interstitial Fluid, and Lymph Flow
CVS-P-016	Describe local control of blood flow in response to tissue needs Discuss role of Humoral factors in control of blood flow Explain acute mechanism of local blood flow control (tissue metabolism & oxygen/nutrient demand) Describe autoregulation of blood flow during changes in arterial pressure—(metabolic and myogenic mechanisms)		Local and Humoral Control of Tissue Blood Flow
CVS-P-017	Define blood pressure and its two primary determinants (cardiac output and total peripheral resistance). Define pulse pressure and mean arterial pressure. Give normal blood pressure value and mean arterial pressure value Define hypertension		Clinical methods for measuring systolic and diastolic pressures Primary (essential) Hypertension

CVS-P-018	Define Cardiac output and venous return. Give their normal values. Enlist and explain factors that affect cardiac output and venous return		Cardiac Output, Venous Return, and Their Regulation
CVS-P-019	Describe role of the nervous system in rapid control of arterial pressure. Enumerate nervous reflex mechanisms for regulation of blood pressure		Nervous regulation of the circulation and rapid control of arterial pressure
	Explain the role of baroreceptors in regulation of arterial blood pressure. Explain the role of chemoreceptors in regulation of arterial blood pressure		
	Explain CNS ischemic response Explain Cushing reaction		
CVS-P-020	Describe role of renin angiotensin aldosterone mechanism in blood pressure regulation Explain stress relaxation and capillary fluid shift Enlist immediate (seconds to minutes), intermediate (after several minutes) and long-term mechanism of blood pressure regulation		Role of the kidneys in long- term control of arterial pressure
CVS-P-021	Define & enlist different types of shock. Explain the causes, features, and pathophysiology of hypovolemic/hemorrhagic shock. Explain the causes, features, and pathophysiology of septic shock. Explain the causes, features, and pathophysiology of neurogenic shock. Explain the causes and features of anaphylactic shock.		Circulatory Shock and its treatment

	Explain cardiogenic shock		
CVS-P-022	Explain stages of shock Enlist & explain compensatory mechanisms during non-progressive shock		
CVS-P-023	Define angina pectoris and myocardial infarction	Medicine	The Coronary Circulation and Ischemic Heart Disease
CVS-P-024	Enlist the different types of heart sounds and explain the physiological basis of each Heart sounds Enlist the causes of 3rd and 4th heart sounds. Define murmur		Heart Valves and Heart Sounds
PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 17**	
		INTEGRATING DISCIPLINE	**TOPIC**
BLOOD			
CVS-Pa-001	Define white blood cell (WBC) disorders and classify them into benign and malignant types. Recognize the causes of reactive leukocytosis (infections, stress, inflammation) that result in elevated WBC counts and its impact on planning and post-operative healing in dental patients Differentiate between reactive and neoplastic WBC disorders based on clinical and laboratory findings. Explain the pathophysiology of leukemoid reactions and leukemias.	Oral Pathology General Medicine Oral Surgery Periodontology	Disorders of WBCs

CVS-Pa-002	Differentiate between reactive and neoplastic WBC disorders based on clinical and laboratory findings. Explain the pathophysiology of leukemoid reactions and leukemias.	Pathology	Disorders of WBCs
CVS-Pa-003	Define the clinical aspects of innate and acquired immunity, including active and passive immunity. List the types of immune cells, such as phagocytes, T cells, B cells, and NK cells, and explain their roles in immunity and disease progression. Describe the complement activation pathways (classical, alternative, and lectin)	Oral Pathology Oral Medicine Oral Surgery Periodontology	Immunology
CVS-Pa-004	List the types of antibodies (IgG, IgA, IgM, IgE, IgD) and discuss their relevance in hypersensitivity reactions.		Immunology
CVS-Pa-005	Explain the types and pathogenesis of hypersensitivity reactions (Type I–IV) and their implications in dental conditions like latex allergies, drug reactions, and autoimmune oral lesions.		Hypersensitivity reactions
CVS-Pa-006	Define the principles of ABO and Rh blood grouping systems. State the importance of compatibility testing, including crossmatching, for safe transfusions. Identify scenarios in dentistry where blood grouping knowledge is essential, such as surgeries or trauma management.	Hematology General Medicine Oral and Maxillofacial Surgery	Blood grouping & complications of blood transfusion
CVS-Pa-007	Define thrombosis, embolism, infarction, and hemorrhage as hemodynamic disorders relevant to systemic and oral health.	General Medicine Oral Pathology	Hemodynamic disorders

	Describe the types of thrombosis, including arterial and venous, and their potential impact on dental procedures, such as delayed healing or increased bleeding risks. Discuss the pathophysiology of thrombosis, focusing on Virchow's triad (endothelial injury, stasis, and hypercoagulability), and its relevance to dental patients with cardiovascular disorders.	Oral Medicine Oral and Maxillofacial Surgery	
CVS-Pa-008	Explain the mechanisms and clinical features of embolism, including pulmonary and systemic embolism. Explain the pathophysiology of embolism, including detachment of thrombi and subsequent vascular occlusion, and its potential effects on oral tissues or emergency scenarios during dental care. Outline the types of infarctions (white and red) and their effects on oral tissues, such as necrosis or ischemic lesions. Describe the pathophysiology of infarction, focusing on ischemia and necrosis in oral and systemic contexts.		hemodynamics
CVS-Pa-009	Define bleeding disorders and their relevance to clinical dentistry. Classify bleeding disorders into vascular, platelet, coagulation, and mixed types. Enlist causes of thrombocytopenia, such as decreased production, increased destruction, or sequestration of platelets.	Oral Pathology Pharmacology and Dental Therapeutics Oral and Maxillofacial Surgery	Hemodynamics Platelets & Bleeding disorders
CVS-Pa-010	List first-line laboratory investigations for bleeding disorders, including complete blood count (CBC),		Hemodynamics

	platelet count, bleeding time (BT), clotting time (CT), prothrombin time (PT), activated partial thromboplastin time (aPTT), and international normalized ratio (INR). Discuss interpretation of laboratory findings and their clinical correlation in diagnosing bleeding disorders (platelet & coagulation related disorder) in dental patients.		
CVS-Pa-011	Apply knowledge of Streptococcus viridans and Staphylococcus aureus to recognize their role in infective endocarditis and bacteremia, and their implications for dental care. Recognize oral manifestations of HIV, including candidiasis, hairy leukoplakia, and periodontal disease, in immunosuppressed patients. Identify oral ulcerations caused by Cytomegalovirus (CMV) or Epstein-Barr Virus (EBV) in immunocompromised individuals. Apply infection control protocols to prevent cross-contamination and transmission of bloodborne pathogens and parasites during dental procedures.	Microbiology Oral Pathology Oral Microbiology Oral Medicine	Microbiology of Blood: Relevance and Implications in Dentistry
CVS			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 03**	
		INTEGRATING DISCIPLINE	**TOPIC**
CVS-Pa-012	Define and classify types of shock (hypovolemic, cardiogenic, septic) and evaluate their pathophysiology and relevance in dental emergencies.		Hemodynamics
CVS-Pa-013	Correlate septicemia caused by cardiovascular pathogens (e.g., *Staphylococcus aureus*,	General Medicine	Microbiology related to CVS & dentistry

	Pseudomonas aeruginosa) with oral manifestations such as petechiae or splinter hemorrhages. Identify microbial causes of myocarditis, such as *Coxsackievirus* and their systemic effects influencing dental care. Assess the role of oral pathogens like *Treponema denticola* and *Porphyromonasgingivalis* in contributing to cardiovascular diseases, including atherosclerosis, and integrate this knowledge into periodontal therapy.	Oral Pathology Oral Medicine Oral and Maxillofacial Surgery	
PHARMACOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 04**	
		INTEGRATING DISCIPLINE	**TOPIC**
BLOOD			
CVS-Ph-001	Classify anti-clotting drugs Compare their usefulness in venous and arterial thrombosis Describe the mechanisms of action, clinical uses and adverse effects of anticoagulants Compare Unfractionated heparin, LMW heparins and oral anticoagulants Compare and contrast the mechanism of action, clinical uses, and toxicities of the oral anticoagulants (warfarin, rivaroxaban, and dabigatran). Explain the pharmacokinetic and pharmacodynamic drug interactions of Warfarin	Gen surgery Medicine Oral medicine Oral & maxillofacial surgery	Anticoagulants

	Describe the mechanisms of action, clinical uses and adverse effects of antiplatelet drugs Illustrate where the 4 major classes of antiplatelet drugs act Differentiate between Clopidogrel and Ticlopidine Discuss the mechanism of action, clinical uses, adverse effects and contraindications of Thrombolytics Tabulate differences between Streptokinase & recombinant tissue plasminogen activators. Classify and give clinical uses of various iron preparations along with their adverse effects.		
CVS			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 20**	
		INTEGRATING DISCIPLINE	**TOPIC**
CVS-Ph-002	Classify vasodilators on the basis of site, route and mechanism of action. Describe the pharmacokinetic properties and side effects of vasodilators. Classify the drugs acting on renin-angiotensin aldosterone system (RAAS). Explain their mechanisms of action, clinical indications, adverse effects and contraindications.	Medicine Oral medicine Oral & maxillofacial surgery	Anti-hypertensive drugs-I ACE inhibitors, AT receptor antagonist, Direct acting vasodilators
CVS-Ph-003	Classify antihypertensives according to site and mechanism of action. Describe the role of sympatholytic drugs in hypertension.	Medicine Oral medicine Oral & maxillofacial surgery	Anti-hypertensive drugs-II Sympatholytic drugs, Diuretics, Ca++

	Recall the role of diuretics in hypertension. Recount the relevance of calcium channel blockers in hypertension Tabulate the compensatory mechanisms of anti-hypertensive drugs		Channel blockers
CVS-Ph-004	Classify the drugs used in the management of angina pectoris Describe important pharmacokinetic aspects of nitrates. Explain mechanism of action of nitrates. Give pharmacological basis for the use of nitrates in angina Enumerate adverse and toxic effects of nitrates	Medicine Oral medicine Oral & maxillofacial surgery	Anti-anginal drugs
CVS-Ph-005	Explain briefly the pathophysiology of heart failure. Recall the compensatory mechanisms in a failing heart. Outline a treatment plan for patients with compensated or decompensated CHF. Enlist major drug groups used for management of congestive heart failure. Explain the role of diuretics, angiotensin-converting enzyme inhibitors and beta blockers, in treating patients with congestive heart failure	Medicine Oral medicine Oral & maxillofacial surgery	Drug treatment for heart failure
CVS-Ph-006	Discuss digoxin and its use in long-term management of congestive heart failure. Describe the mechanism of action of Digoxin.	Medicine Oral medicine Oral & maxillofacial surgery	Drug treatment for heart failure

	Recount the mechanical and electrical effects of Digoxin. Enumerate and explain the clinical uses of Digoxin. Describe the important side-effects, contraindications & drug interactions of Digoxin. Explain the treatment and management of digitalis toxicity.		
CVS-Ph-007	Classify anti-arrhythmic drugs. Describe cardiac, noncardiac effects of class I drugs (all subgroups). Enumerate therapeutic uses and major side-effects of all class I antiarrhythmic drugs. Describe the important antiarrhythmic actions of class II drugs. Enumerate clinical indications and side-effects of class II drugs. Explain the actions, uses and side-effects of class III drugs(amiodarone). Describe the actions, uses and adverse effects of calcium channel blockers (class IV drugs). Describe briefly the salient features of adenosine as an antiarrhythmic and its toxicity	Medicine Oral medicine Oral & maxillofacial surgery	Anti-arrhythmic drugs
CVS-Ph-008	Describe the mechanism of action, indications/clinical uses and adverse effects of tranexamic acid and aminocaproic acid	Oral & maxillofacial surgery	Antifibrinolytics

CVS-Ph-009	Identify cardiovascular risks associated with NSAID use and briefly explain the underlying pharmacological mechanisms Describe the antiplatelet mechanism of action of low-dose aspirin and its role in the prevention of myocardial infarction Differentiate between the use of low-dose and high-dose aspirin in cardiovascular vs. anti-inflammatory indications	Oral medicine Oral & maxillofacial surgery	Analgesics

PRACTICALS			
ANATOMY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 04**	
		INTEGRATING DISCIPLINE	**TOPIC**
CVS-A-005	Identify under light microscope/ draw and label arteries	Microscopic Anatomy	Arteries
CVS-A-006	Identify under light microscope/ draw and label veins and capillaries	Microscopic Anatomy	Veins
CVS-A-007	Demonstrate proper hand hygiene and use of personal protective equipment (PPE) during preparation for the procedure.	Clinical Skills / Medical Emergencies	Infection Control and PPE in Clinical Practice
CVS-A-008	Identify appropriate venous access sites on a simulation model using surface anatomy and vein palpation techniques.	Clinical Skills / Medical Emergencies	Venous Access Site Identification
CVS-A-009	Perform intravenous cannulation on a simulation arm model, including: Patient preparation and positioning, Tourniquet application, Site cleaning and asepsis, Cannula insertion, flashback confirmation, and	Clinical Skills / Medical Emergencies	IV Cannulation Procedure

	securing the IV line, Disposal of sharps and used materials.		
CVS-A-010	Manage post-procedure care, including documentation, patient monitoring, and recognizing signs of infiltration or complications.	Clinical Skills / Medical Emergencies	Post-IV Cannulation Care and Complications Management
CVS-A-011	Communicate effectively and empathetically with simulated patients or team members before, during, and after the procedure.	Professionalism / Communication Skills	Effective Patient and Team Communication
CVS-A-012	Demonstrate confidence and competence in performing the procedure under faculty supervision.	Professionalism / Clinical Competency	Professional Conduct in Clinical Skills
CVS-A-013	Reflect on the importance of IV access in medical emergencies related to dental practice (e.g., anaphylaxis, hypoglycemia, cardiac emergencies).	Medical Emergencies / Dental Practice	IV Access in Dental Medical Emergencies
BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 06**	
		INTEGRATING DISCIPLINE	**TOPIC**
CVS-B-012	Understand the principle, procedure and uses of electrophoresis (demonstration only).	Biochemistry	Introduction to laboratory techniques
CVS-B-013	Describe the types of plasma proteins and explain their general functions.	General Medicine	Plasma proteins
CVS-B-014	Describe serum albumin and globulins and explain their biological roles in the human body.		Plasma proteins
CVS-B-015	List the components of a lipid profile and describe the significance of cardiac enzyme markers (TropT, CK-MB) in cardiovascular health.		Lipid profile
PHYSIOLOGY			

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 18	
CVS-P-025	Observe the demonstration of blood grouping procedure and explain its clinical relevance in dental practice, including its role in managing medical emergencies.	Physiology / Oral Surgery / Medical Emergencies	Blood Grouping Awareness in Clinical Dentistry
CVS-P-026	Observe the demonstration of bleeding time measurement and explain its importance in assessing bleeding risk in dental procedures.	Physiology / Oral Surgery / Hemostasis	Bleeding Time Awareness in Clinical Dentistry
CVS-P-027	Observe the demonstration of clotting time measurement and explain its relevance to safe dental practice.	Physiology / Oral Surgery / Hemostasis	Clotting Time Awareness in Clinical Dentistry
CVS-P-028	Observe and identify the normal waveforms and intervals on a sample ECG tracing.	Physiology / Oral Medicine / Cardiology	ECG Waveform Recognition
CVS-P-029	Calculate heart rate from a provided normal ECG tracing and describe its clinical significance.	Physiology / Oral Medicine / Cardiology	ECG-Based Heart Rate Calculation
CVS-P-030	Demonstrate how to locate and palpate the apex beat on a simulation model or peer under supervision.	Physiology / Oral Medicine / Clinical Skills	Cardiac Examination Basics
CVS-P-031	Demonstrate the correct method to auscultate the precordium for heart sounds under supervision.	Physiology / Oral Medicine / Clinical Skills	Cardiac Auscultation Basics
CVS-P-032	Demonstrate blood pressure measurement using palpatory and auscultatory methods in the sitting position under supervision.	Physiology / Oral Medicine / Clinical Skills	Blood Pressure Measurement Techniques
CVS-P-033	Demonstrate the effect of posture on blood pressure measurement under supervision.	Physiology / Oral Medicine / Clinical Skills	Postural Influence on Blood Pressure
CVS-P-034	Observe and describe the radial pulse characteristics, including rate, rhythm, and volume, under supervision.	Physiology / Oral Medicine / Clinical Skills	Pulse Examination Awareness
CVS-P-035	Demonstrate the basic steps of cardiopulmonary resuscitation (CPR) on a simulation model under supervision.	Medical Emergencies / Oral Medicine / Clinical Skills	Basic Life Support (BLS) Introduction
PATHOLOGY-CVS			

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 04	
CVS-Pa-014	Perform differential WBC count and correlate findings with clinical cases of leukocytosis or leukopenia. (Practical) Identify oral manifestations of WBC disorders (e.g., gingival bleeding, delayed wound healing). (Tutorial) Demonstrate infection control measures for patients with compromised immunity. (Tutorial)	Oral Medicine	Disorders of WBCs
CVS-Pa-015	Demonstrate skin prick testing for Type I hypersensitivity reactions. (Practical) Identify oral manifestations of autoimmune diseases. (Tutorial)	Pathology, Oral Medicine	Immunology
CVS-Pa-016	Perform blood typing and crossmatching procedures. (Practical) Recognize clinical signs of transfusion reactions and their emergency management. (Tutorial) Identify scenarios in dentistry requiring knowledge of blood grouping (e.g., trauma management). (Tutorial)	Hematology, General Medicine Oral and Maxillofacial surgery General Surgery	Blood Grouping & Transfusion Complications
CVS-Pa-017	Identify clinical signs of thrombosis, embolism, or hemorrhage during oral examinations. (Tutorial) Interpret lab findings related to coagulation profiles (e.g., INR, PT, aPTT). (Practical) Manage dental patients on anticoagulant therapy to minimize bleeding risks. (Tutorial)	General Medicine, Oral Pathology Oral and Maxillofacial Surgery General Surgery	Hemodynamic Disorders
PHARMACOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05**	
CVS-Ph-010	Describe the common classes of antihypertensive and anticoagulant medications and their relevance to dental care.	Pharmacology / Oral Medicine / Medical Emergencies	Pharmacological Considerations in Dental Practice

CVS-Ph-011	Identify potential drug interactions and describe the importance of modifying dental procedures for patients on these medications.	Pharmacology / Oral Medicine / Medical Emergencies	Drug Interactions and Procedural Modifications

Module No. 08
GASTROINTESTINAL TRACT

MODULE RATIONALE

The Gastrointestinal (GI) Tract module has been designed to integrate foundational biomedical knowledge with clinical application, fostering a comprehensive understanding of this essential system. This module is pivotal for dental students to understand the interrelationship between systemic health and oral conditions, enabling them to provide holistic patient care.

1. **Anatomical and Physiological Correlation**: Dental practitioners must understand the intricate anatomy and physiology of the GI system to effectively interpret oral signs of systemic diseases.
2. **Systemic Interrelations**: Disorders such as gastroesophageal reflux disease (GERD) often present with oral symptoms, including halitosis, xerostomia, and mucosal lesions. This module emphasizes the bidirectional relationship between oral and systemic health.
3. **Oral Complications of GI and UG Disorders**: The module highlights conditions such as:
    - Peptic ulcers and their implications for prescribing NSAIDs in dental practice.
    - Hormonal influences from the GI system affecting periodontal health.
4. **Pharmacological Considerations**: To understand the dental implications of drugs commonly prescribed for GI conditions, such as proton pump inhibitors, and antacids.

Public Health Perspective: To inculcate awareness regarding the prevalence of malnutrition, dehydration, and infections related to the GI system and their impact on oral and systemic health in the community.

MODULE OUTCOMES

- Describe in detail Oral Cavity functions and its regulations
- Demonstrate a functional understanding of GI system anatomy, physiology, pathology and biochemistry.
- Discuss the anatomy, development, histological structure, and functions of salivary glands.
- Describe the functional physiological anatomy of the GI system and its associated structures.
- Explain the movements, secretions, and regulations of gastrointestinal functions.
- Describe common pathological conditions like Peptic Ulcers, Ulcerative Colitis & Irritable Bowel Syndrome.

SUBJECTS INTEGRATED IN THE MODULE

- Anatomy
- Oral Biology and Tooth Morphology
- Physiology
- Biochemistry

- Pharmacology
- General Pathology & Microbiology
- Oral Pathology
- Preventive & Community Dentistry


SYLLABUS

ANATOMY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 26	
		INTEGRATING DISCIPLINE	TOPIC
GIT-A-001	Describe the parts and boundaries of oral cavity.	Anatomy / Oral Biology	Oral Cavity Anatomy
GIT-A-002	Describe the anatomical features of tongue with emphasis on its musculature, vascular supply and lymphatic drainage.	Anatomy / Oral Biology	Tongue Structure and Vascular Supply
GIT-A-003	Describe the extracranial course, distribution and branches of nerves with special reference to their lesions: Trigeminal, Glossopharyngeal, Hypoglossal, Vagus.	Anatomy / Oral Biology	Extracranial Cranial Nerve Anatomy and Lesions
GIT-A-004	Describe the anatomical features of hard and soft palate with their neurovascular supply.	Anatomy / Oral Biology	Palate Anatomy and Neurovascular Supply
GIT-A-005	Describe the attachments of muscles of soft palate along with their actions and nerve supply.	Anatomy / Oral Biology	Muscles of Soft Palate
GIT-A-006	Describe anatomical features and neurovascular supply of salivary glands.	Anatomy / Oral Biology	Salivary Glands Anatomy and Neurovascular Supply
GIT-A-007	Discuss the clinical correlates of parotid gland: Mumps, Frey's syndrome.	Anatomy / Oral Biology	Parotid Gland Clinical Correlates
GIT-A-008	Describe the location, roots and distribution of submandibular and otic ganglia.	Anatomy / Oral Biology	Submandibular and Otic Ganglia

GIT-A-009	Name the parts of pharynx giving their extent, anatomical features, structure and neurovascular supply.	Anatomy / Oral Biology	Pharynx Anatomy and Neurovascular Supply
GIT-A-010	Describe the attachments of muscles of pharynx along with their actions and nerve supply.	Anatomy / Oral Biology	Muscles of Pharynx
GIT-A-011	Discuss the location, anatomical features and vascular supply of palatine tonsils.	Anatomy / Oral Biology	Palatine Tonsil Anatomy and Vascular Supply
GIT-A-012	Discuss the clinical correlates of piriform fossa and tonsils: Adenoids, Quincy, Tonsilitis.	Anatomy / Oral Biology	Piriform Fossa and Tonsils Clinical Correlates
GIT-A-013	Enlist the structures forming the Waldeyer's ring of lymphatic tissue.	Anatomy / Oral Biology	Waldeyer's Ring of Lymphatic Tissue
GIT-A-014	Describe the anatomical features of cervical part of esophagus with its neurovascular supply.	Anatomy / Oral Biology	Cervical Esophagus Anatomy and Neurovascular Supply
SYSTEMS-BASED HISTOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-A-015	Describe the light microscopic structure of lip	Systems-Based Histology	Oral Cavity
	Describe the light microscopic structure of lip		
SYSTEMS-BASED EMBRYOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	
		INTEGRATING DISCIPLINE	**TOPIC**

GIT-A-016	Describe the development of tongue	Systems-Based Embryology	Oral Cavity
ORAL BIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 15**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-OB-001	Describe the introduction to oral mucosa	Oral Histology	Oral Mucosa
	Explain the morphological and histological structure of oral mucosa.		
	Describe and explain the component tissues and glands of oral mucosa.		
	Enumerate and discuss the details of the non-keratinocytes in the oral epithelium and lamina propria.		
	Discuss the vasculature and innervations of oral mucosa along with the structural variations observed in it.		
	Explain the mucocutaneous junctions in the oral mucosa.		
	Describe the age-related changes in oral mucosa		
GIT-OB-002	Introduction to taste and its different events. What are the major taste support systems?	Physiology	Physiology of Taste
	Discuss the four basic taste sensations/ taste stimuli		

	Elaborate the structure and location of taste buds		
	Explain the mechanism of taste		
	What do you know about abnormal taste sensations?		
	Enumerate or enlist the different conditions affecting taste		
GIT-OB-003	Describe the development of major & minor salivary Glands.	Oral Embryology	Salivary Glands
	Describe the histology of major and minor salivary glands	Oral Histology	
	Elaborate its changes with age and its clinical considerations		
GIT-OB-004	Discuss the mechanism of saliva formation and how the saliva modifies in the duct.	Oral Physiology	Saliva
GIT-OB-005	Define Mastication and what are the structures involved in masticatory movement.		Physiology of Mastication
	Elaborate chewing cycle of mastication.		
	What are the different stages of mastication?		
	What are the different muscles involved in mastication? Give their origin, insertions, innervation, and functions		

	Briefly describe the neurological control of mastication		
GIT-OB-006	Introduction to the term swallowing and deglutition		Physiology of Swallowing
	What are the stages of swallowing?		
	Elaborate the pathway of swallowing and its neural control.		
PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 15**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-P-001	Describe physiologic anatomy of gastrointestinal tract. Discuss electrical activity of smooth muscles of GIT.	Physiology	General Principles of GIT Function - Motility, Nervous Control
	Describe the mechanism of excitation of smooth muscle of gastrointestinal tract.		
	Discuss the factors that depolarize and hyperpolarize GI membrane.		
GIT-P-002	Describe the role of autonomic nervous system in regulation of GIT's function.	Physiology	Neural control of GIT function (Enteric Nervous system) GIT Hormones
	Describe enteric nervous system.		

	Describe the Meissner's plexus and differentiate between myenteric and Meissner's plexuses		
	Enlist the gastrointestinal reflexes & explain the functions of these reflexes.		
	Give the stimuli, site of release and actions of cholecystokinin, Gastrin, Secretin & Motilin (enteroendocrine cells)		
	Differentiate between sympathetic and parasympathetic modulation of the enteric nervous system and the effector organs of the GI tract	Physiology & Pharmacology	
GIT-P-003	Discuss functional movements of GIT (propulsive & mixing)	Physiology	Functional types of movements in the GI tract
GIT-P-004	Discuss the pathophysiology& features of achalasia & Mega esophagus.	Pathology & Physiology	Esophagus
GIT-P-005	Enlist the functions of saliva	Physiology	Role of mucous and saliva
GIT-P-006	Describe the stages of vomiting act. Appraise the location and function of vomiting center/ chemoreceptor trigger zone in the brain		Vomiting Reflex
GIT-P-007	Explain motor function of stomach. Explain factors which regulate stomach emptying		Motor function of Stomach
GIT-P-008	Describe characteristics & functions of the gastric secretions.		Gastric secretion

GIT-P-009	Discuss the role of Intrinsic factor from gastric parietal cells		
GIT-P-010	Define and discuss basic causes of gastritis and Pernicious anemia.	Pathology & Physiology	Pathophysiology of Stomach
	Define & enumerate the causes and pathophysiology of peptic ulcer		
GIT-P-011	Enumerate the types of movements taking place in small intestine and mention their function.	Physiology	Movements of the small intestine General
	What is peristaltic rush and enteritis?		
GIT-P-012	Enumerate the types of movements taking place in colon and give their functions	Physiology & Microbiology	Movements of the Colon
	Discuss defecation reflex.		
BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 10**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-B-001	Elaborate the composition and functions of saliva.	Physiology Oral biology, Oral pathology, Operative dentistry	Saliva
	Give etiology and clinical features of xerostomia. Suggest the management options for patients suffering from xerostomia		
	Give biochemical explanation for rampant caries in cases of xerostomia.		

GIT-B-002	Give composition and functions of gastric juice. Correlate chronic use of NSAIDs with development of peptic ulcer	Physiology, Biochemistry, Pharmacology, General Medicine	Gastric secretions
GIT-B-003	Give composition and functions of pancreatic juice, bile and succus entericus		Pancreatic juice, bile and succus entericus
GIT-B-004	Describe the mechanism of digestion and absorption of dietary carbohydrates		Digestion and absorption
	Give cause, clinical features, diagnosis and management of lactose intolerance.		
	Describe the mechanism of digestion and absorption of dietary proteins.		
	Give the causes and clinical features of: • Hartnup Disease • Cystinuria		
	Explain the process of digestion and absorption of dietary lipids.		

PHARMACOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 08**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-Ph-001	Classify the drugs used for the treatment of Acid-Peptic Disease (APD) Explain their mechanism of action, uses and adverse effects Correlate chronic use of NSAIDS with development of peptic ulcer. Write down Tripple and Quadruple regimen for APD	Pharmacology	Acid Peptic disease

GIT-Ph-002	Classify antiemetics Describe the mechanism of action, clinical uses, and adverse effects of metoclopramide Compare metoclopramide and Domperidone Name the drugs used in the prevention of chemotherapy- or radiation-induced emesis List prokinetic agents		Antiemetics and Prokinetics
GIT-Ph-003	Classify Laxatives Classify antidiarrheals		Laxatives, antidiarrheals
GENERAL PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-Pa-001	Define heartburn and describe its pathophysiology as a symptom of gastroesophageal reflux disease (GERD).	General Pathology, Oral Pathology, Oral Medicine & Microbiology	GERD
	Enumerate the etiology and clinical features of GERD and peptic ulcer disease.		
GIT-Pa-002	Define peptic ulcer disease (PUD) and distinguish between gastric and duodenal ulcers. Discuss H. Pylori as Peptic Ulcer Disease causing organism, its epidemiology, virulence factors, pathogenesis, lab diagnosis & prevention.		Peptic Ulcer
	Enlist causes of PUD Explain the pathogenesis of PUD		
GIT-Pa-003	Discuss the pathophysiology of irritable bowel syndrome		IBD
MICROBIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 08**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-Mic-001	Enlist different organisms causing oral lesions.	Microbiology	Oral lesions

	Briefly discuss HPV, EBV, as disease causing organisms, their epidemiology, virulence factors, pathogenesis, lab diagnosis & prevention.		
GIT-Mic-002	Define terms as: constipation, Acute Diarrhea & Chronic Diarrhea, Vomiting and Dysentry		Diarrhea causing organisms
	Enlist different Diarrhea causing organisms.		
	Briefly discuss E. coli with its epidemiology, virulence factors, pathogenesis, lab diagnosis & prevention.		
	Briefly discuss Salmonella as diarrhea and typhoid causing organism, its epidemiology, virulence factors, pathogenesis, lab diagnosis & prevention.		
	Briefly discuss Clostridium botulinum, Clostridium difficile with its epidemiology, virulence factors, pathogenesis, lab diagnosis & prevention.		
	Briefly discuss intestinal protozoa (Entamoeba histolytica, Giardia, Cryptosporidium) with its epidemiology, virulence factors, pathogenesis, lab diagnosis & prevention.		
ORAL PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 04**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-OP-001	Discuss clinical abnormalities of Salivary secretions.	Oral Pathology	Abnormalities of salivary secretions
	Give etiology and clinical features of xerostomia.		
GIT-OP-002	Define and enlist the types of aphthous ulcers (minor, major, herpetiform) Enlist their distinguishing features.		Aphthous ulcers
	Discuss the potential etiological factors, including stress, trauma, and nutritional deficiencies.		
COMMUNITY DENTISTRY & PUBLIC HEALTH			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	

		INTEGRATING DISCIPLINE	TOPIC
GIT-CD-001	Define obesity, classify obesity	Community Dentistry and Public Health	Epidemiology of obesity and related issues
	Outline the epidemiology of obesity and related issues in respect of oral health.		
	Understand hazards, prevention and control of obesity		
PRACTICALS			
MICROSCOPIC ANATOMY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 04**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-A-015	Identify under light microscope and draw and label the light microscopic structure of lip.	Oral Histology	Microscopic Structure of Lip
GIT-A-016	Identify under light microscope and draw and label the light microscopic structure of tongue.		Microscopic Structure of Tongue
PHARMACOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-Ph-004	Demonstrate the preparation and dispensing of three doses of Carminative mixture under supervision.	Pharmacy / Clinical Pharmacology	Preparation of Carminative Mixtures
GIT-Ph-005	Demonstrate the preparation and dispensing of four doses of ORS solution under supervision.	Pharmacy / Clinical Pharmacology	Preparation of Oral Rehydration Solution
GIT-Ph-006	Demonstrate the preparation of Normal Saline or Dextrose Water solution under supervision.	Pharmacy / Clinical Pharmacology	Preparation of IV Solutions
PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 04**	
		INTEGRATING DISCIPLINE	**TOPIC**

GIT-P-013	Demonstrate the examination of the sensory and motor parts of the Trigeminal nerve under supervision.	Physiology / Clinical Neurology	Cranial Nerve V (Trigeminal) Examination
GIT-P-014	Demonstrate the examination of the sensory and motor parts of the Glossopharyngeal nerve under supervision.		Cranial Nerve IX (Glossopharyngeal) Examination
GIT-P-015	Demonstrate the examination of the sensory and motor parts of the Vagus nerve under supervision.		Cranial Nerve X (Vagus) Examination
GIT-P-016	Demonstrate the examination of the sensory and motor parts of the Hypoglossal nerve under supervision.		Cranial Nerve XII (Hypoglossal) Examination
ORAL HISTOLOGY & ORAL PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05**	
		INTEGRATING DISCIPLINE	**TOPIC**
GIT-A-017	Draw and label the keratinized and non-keratinized oral epithelium, specialized mucosa including tongue papillae and mucocutaneous junction.	Oral Histology	Oral Epithelium and Specialized Mucosa
GIT-A-018	Draw and label the histological structure of the taste bud, and mention the specificity of the tongue for different taste sensations.	Oral Histology / Physiology	Taste Bud Structure and Tongue Sensory Map
GIT-A-019	Identify in images or slides the histological section of the tongue showing different tongue papillae and the location of taste buds.	Oral Histology	Tongue Papillae and Taste Bud Identification
GIT-A-020	Draw and label the histological section of major salivary glands, showing serous and mucous acini, serous demilunes, and cells of intercalated, striated, and excretory ducts.		Salivary Gland Histology
GIT-A-021	Identify the correct stage of swallowing on provided images or models.	Physiology / Oral Biology	Swallowing Mechanism Stages

Module No. 09
OCCLUSION-I

MODULE RATIONALE

Occlusion forms the cornerstone of understanding normal dental anatomy, function, and the dynamic relationships between the teeth, and associated structures. The Occlusion 1 module, focusing on incisors and canines is a foundational course designed to equip dental undergraduates with essential knowledge and skills for analyzing, diagnosing, and managing occlusal relationships and related conditions. By concentrating on anterior segments in this module, students can build a solid understanding of occlusal principles before advancing to more complex posterior and full-arch concepts. By focusing on incisors and canines, this module ensures a systematic and progressive approach to mastering occlusion, bridging the gap between dental anatomy and complex clinical procedures. This early exposure to occlusion will enhance students' ability to deliver functionally and esthetically sound treatments, setting the stage for more advanced learning in their dental education.

MODULE OUTCOMES

- Describe the morphology and functional roles of incisors and canines in occlusal dynamics.
- Analyze the occlusal relationship of incisors and canines using models, articulators, and clinical examinations.
- Demonstrate an understanding of the importance of incisors and canine’s occlusion in maintaining oral function and preventing dysfunction

SUBJECTS INTEGRATED IN THE MODULE

- Oral Biology & Tooth Morphology


SYLLABUS

THEORY			
ORAL BIOLOGY & TOOTH MORPHOLOGY			
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 16	
		INTEGRATING DISCIPLINE	TOPIC
Oc1-OB-001	Describe the basic concepts of occlusion and its importance and relevance in dentistry.	Tooth Morphology & Occlusion	Occlusion
Oc1-OB-002	Describe the crown morphology of deciduous & permanent incisors.		Deciduous & Permanent Incisors
	Describe the key identification points of deciduous & permanent incisors		
	Describe the normal root and pulpal morphology of maxillary and mandibular incisors		
	Identify and classify common structural anomalies of incisors		
	Interpret periapical radiographs of incisors, recognizing normal anatomy and common anomalies.		
Oc1-OB-003	Describe the crown morphology of deciduous & permanent canines		Deciduous & Permanent canines
	Describe the normal root and pulpal morphology of maxillary and mandibular canines		

	Describe the key identification points of deciduous & permanent canines		
	Identify and classify common structural anomalies of canines		
	Interpret periapical radiographs of canines, recognizing normal anatomy and common anomalies.		
	Define and differentiate between overjet and overbite, and explain their clinical significance.		
Oc1-OB-004	Define forensic odontology and explain the significance of forensic odontology in dental identification and legal investigations.	Oral Biology	Forensic odontology

PRACTICALS

ORAL BIOLOGY & TOOTH MORPHOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 18	
		INTEGRATING DISCIPLINE	TOPIC
Oc1-OB-005	Draw the outlines of all deciduous & permanent incisors: labial, lingual, mesial, distal & incisal aspects	Tooth Morphology & Occlusion	Deciduous & Permanent Incisors
	Label each aspect pointing their morphological features (Incisal corners, marginal ridges, fossa, cingulum, pit, developmental depressions, imbrication lines & contact points)		

	Carve anatomically accurate models of incisors from soap blocks.		
	Identification on models (Permanent Incisors)		
Oc1-OB-006	Draw the outlines of all deciduous & permanent canines: labial, lingual, mesial, distal & incisal aspects		Deciduous & Permanent canines
	Label each aspect pointing their morphological features (Incisal slopes, labial/lingual ridges, marginal ridges, fossa, cingulum, developmental depressions, imbrication lines & contact points)		
	Identification on models (Permanent Canines)		
	Carve anatomically accurate models of canines from soap blocks.		
	Describe the principles and purpose of preparing ground sections of teeth.		
	Prepare a ground section of a tooth with appropriate thickness for microscopic examination.		
	Recognize key structural details of enamel, dentin, and cementum in the sectioned sample.		

BDS Integrated Curriculum 2K25

Version 01

The Holy Quran

1. MODULE RATIONALE

The Holy Quran provides wisdom and knowledge to be followed in every applied component of modern civilization covering Ethical, Social, Legal, Financial and Healthcare Domains. The complete Quran encompasses the guidelines, all full of 'Hikmah' (wisdom) to deal with all practical scenarios encountering patients and health professionals. As the Holy Quran is the guiding light for humanity and a way of life for all the believers of one true Allah, therefore, understanding the message of this Holy Book is mandatory for realizing the duties which one has towards other human beings in general and the profession in particular. Holy Quran is a guide for the modern society and scientific development therefore, orbiting around Quranic doctrines and axioms of Hadith, all challenges faced by modern healthcare can be solved. Therefore, this longitudinal curriculum is developed so that all health professionals can get, as enunciated by the Holy Quran itself, "the best of this world as well as the best of the Hereafter".

2. VISION & MISSION

2.1: Vision: Building the personality and character of health professionals in light of teachings of the Holy Quran and Sunnah, to alleviate human sufferings.

2.2: Mission: Teaching Holy Quran and Sunnah to undergraduate students of Health Sciences, building their personality and character, enabling them to apply these principles in patient care and innovative research.

3. CURRICULUM DESIGN AND ORGANIZATION

3.1: Course Aim: The Holy Quran course aims to imbibe Health profession students with professionalism, general and medical, based on Divine teachings. The professionals thus groomed shall be able to correlate religion with healthcare delivery and modern science with an understanding that evidence-based practice itself originated from the system by which the "Hadith" was preserved after centuries.

3.2: Mode of Delivery: The module will be taught in the form of interactive lectures.

3.3: Learning Experience: Classroom environment will be used.

3.4: Attendance: Eighty five percent (85%) attendance is mandatory to be eligible to sit in the professional examination.

3.5: Course Modules for Year 1 and Year 2

The curriculum will be taught under three Major Sections

- Faith
- Worship
- Specific Quranic Commandments

3.6: Module Credit hours & Contact hours: This will be a three (03) credit hour course where each credit hour will be equivalent to eighteen (18) contact hours.

3.7: Assessment Portfolio

The assessment will be done through student portfolios based on four written assignments and two quizzes per year. The portfolio submission to the Quran teacher will be mandatory for sending admission to the university and sitting in the professional examination. The assignments will be based on the topics discussed during the year. One will be given after first half of the course will be completed for the year and second will be given at the completion of the Quran course.

3.8: Reference Material

- Translations of the Holy Quran approved by the Quran Board
- Six Authentic Books of Hadith

3.9. Module Faculty

At least one full time faculty member (Lecturer or above) will be hired for running the Holy Quran course throughout four years. The qualifications of the faculty member will be certified by the academic council of the college/institution to be declared as the teacher of Holy Quran course.


SYLLABUS

Quran: Year-1

SECTION ONE: FAITH (AQAID)

LEARNING OUTCOMES

a. Oneness of Allah (SWT) (Tawheed)

i. Describe Unity of Allah in being
ii. Describe Unity of Allah in attributes
iii. Describe concept of Shirk
iv. Impact of Tawheed in human life

b. Prophethood (Risalat)

i. Explain Significance of Risalat
ii. Identify Prophets as role models
iii. Recognize finality of Prophethood - Prophet Muhammad (PBUH)

c. Belief in Hereafter (Aakhirat)

i. Appraise continuity of life beyond material world
ii. Concept of Doomsday and its various stages
iii. Concept of Day of Judgment and accountability in the Hereafter
iv. Concept of “Meezan”

d. Divine Revelations (Holy Books)

i. Explain the divine decree in sending the Holy Books
ii. Identify the Holy Quran as the only preserved & authenticated divine revelation to date
iii. Interpret Quran as Furqan

e. Angels

i. Discuss belief in angels and its significance
ii. Describe the universal role of angels (their specific duties)

f. Qadr

i. Identify Taqdeer as Knowledge of Allah
ii. Explain the concept of Faith in Good and Evil

CONTENTS

1. Oneness of Allah subhan wa taala (Tawheed)
2. Prophethood (Risalat)
3. Belief in Hereafter (Akhirat)

4. Devine revelations (Holy Books)

SECTION TWO: WORSHIP (IBADAAT)

LEARNING OUTCOMES

a. Prayer (Namaz)

i. Recognize the importance of physical purity (Taharah)
ii. Discuss the philosophy of prayer and its role in purification of soul
iii. Recognize the importance of prayer in building personal character - sense of duty, patience, perseverance, punctuality and self/social discipline
iv. Spiritual, moral and social impact of prayer in building of righteous community
v. Role in creating brotherhood, equality and unity in ummah
vi. Identify the conditions in which relaxation in prayer is allowed e.g. during operation, travelling etc.

b.Obligatory Charity (Zakat)

i. Identify obligatory importance of Zakat and other items as outlined under the title of 'Infaq-fee-sabilillah'
ii. Categorize the people who can be the beneficiaries of Zakat
iii. Role of zakat in eradication of greed and love of material world
iv. Effect of Zakat and sadaqat in circulation of wealth and alleviation of poverty
v. Explain the essence of zakat and sadaqat in building just communities
vi. Describe the role of state in collection and disbursement of zakat

c.Fasting (Roza)

i. Discuss the importance and significance of fasting
ii. Relate the Holy Quran and the month of Ramadan
iii. Role of fasting in building personal qualities like self-control, piety and soft corner for the poor and needy persons
iv. Identify the applications of "Taqwa" through fasting

d. Pilgrimage (Hajj)

i. Discuss the importance and significance of Hajj
ii. Identify the conditions in which Hajj becomes an obligation
iii. Role of manasik-e-Hajj in producing discipline and complete submission
iv. Recognize the importance of Hajj in uniting the ummah
v. Sacrifice for Allah subhan wa taala (essence of qurbani)

TOPIC AREAS

1. Prayer (Salah/Namaz)
2. Obligatory charity (Zakat)
3. Fasting (Saum/Roza)
4. Pilgrimage (Hajj)

Quran: Year-2

SECTION THREE: SPECIFIC QURANIC COMMANDMENTS
LEARNING OUTCOMES

a. Importance of the protection of Human life

i. Concept of the sanctity of human life in Quran and Sunnah
ii. Importance and significance of a single human being even during war
iii. Concept of punishment in regard to the killing of a human being, voluntarily or involuntarily

b. Jihad

i. Concept of Jihad and its significance (hikmat)
ii. Different forms of Jihad and their importance
iii. Principles and preparation of Jihad
iv. Devine reward of Jihad

c. Heirship/Inheritence (Virasat)

i. Heirship and division of wealth in accordance with divine teachings
ii. Heirs and their shares
iii. Legal aspect of virasat (Hud-e-Illahi)

d. Amar-bil-maroof-wa-Nahi-anil-munkar

i. Differentiation between Maroof and Munkar
ii. Importance and significance (effects of avoiding this principle)
iii. Necessary conditions of both amar-bil-maroof and nahi-anil-munkar
iv. The different stages and the necessary prerequisites

e. Hadood-e Illahee and taazeerat

i. Meaning and various types of hadood-e-Illahee
ii. Authority for fixation of limit (hudd)
iii. Criteria and permissible relaxation in fixing the limits
iv. Difference between ‘Hadood’, ‘Qisas’ and ‘Tazeerat’. Punishments which are left to the court of law
v. Benefits for the good of community

f. Justice (Adal-o-insaf)

i. Justice of Allah subhan wa taala
ii. Importance of justice for the survival of community
iii. Need of justice to be prevailed irrespective of religion
iv. Devine reward for fair justice

g. Business (Bay-o-tijarat)

i. Importance of fair business and its necessary constituents
ii. Permissible and impermissible conditions of businesses
iii. Concept of loan in businesses

h. Interest (Riba or Sudi karobar)

i. Meaning of Riba or interest and its different forms
ii. Impact of Riba on a society in general
iii. Devine declaration and its punishment both in this world and Hereafter

i.Nikah-o-talaq

i. Basic rulings regarding marriage and divorce
ii. Importance of Nikah and its constituents
iii. Conditions of Nikah and various forms of prohibited/impermissible nikah
iv. Misconception of dowry
v. Talaq and its various forms
vi. Meaning of Khula and its conditions

CONTENTS

1. Importance of the protection of Human life
2. Jihad
3. Heirship/Inheritence (Virasat)
4. Amar-bil-maroof-wa-Nahi-anil-munkar
5. Hadood-e Illahee and taazeerat
6. Justice (Adal-o-insaf)
7. Business (Bay-o-tijarat)
8. Interest (Riba or Sudi karobar)
9. Nikah-o-talaq

BDS Integrated Curriculum 2K25

Version 01

Islamiyat & Pakistan Studies

MODULE RATIONALE

This module comprises of Islamiyat & Pakistan Studies. All the medical or other curricula relate to our core context and internal fiber. The study of religion and country endorses all relevancy and competency acquisition for the purpose of service to humanity and community orientation.

ISLAMIYAT (Total Hours = 30)

A short course on Islamic Studies will be completed in First and Second year with an exam at the end of second year.

Course Content:

1. Understand the basic principles of Islam.
2. Explain the concept of the Islamic state.
3. Explain the Quran as a guide for modern society and scientific development.
4. Describe the life of the Holy Prophet Peace be upon him as an example to follow.
5. Explain ethics in the Islamic prospective.
6. Describe the rights of the individual in Islam.
7. Describe the rights of women and children in Islam.
8. Explain the contribution of Islamic scholars to science and medicine.
9. Understand Islam in terms of modern scientific development.
10. Explain the concept of Rizk-e-Hilal.
11. Explain the concept of Hukook-ul-Ibad.

PAKISTAN STUDIES (Total Hours = 30)

A short course on Pakistan Studies will be completed in First and Second year with an exam at the end of second year.

Course Content:

1. Describe brief the salient features of the Pakistan movement.
2. Explain the basis for the creation of Pakistan.
3. Give a brief account of the history of Pakistan.
4. Explain the ethnic and cultural distribution of the population of Pakistan.
5. Describe the Provinces and resources available in Pakistan.
6. Explain current problems faced by Pakistan.
7. Describe the social, economic and health problems of the rural population of Pakistan.

ISLAMIYAT AND PAKISTAN STUDIES BOOKS
• Standard Islamiyat (Compulsory) for B.A, B.Sc., M.A, M.Sc., MBBS by Prof. M.Sharif Islahi Ilmi Islamiyat (Compulsory) for B.A. B.Sc., & equivalent. • Pakistan studies (Compulsory) for B.A. B.Sc., B.Com., Medical/Engineering by Prof. Shah Jahan Kahlun • Pakistan studies (Compulsory) for B.A, B.Sc., B.Com., B.Ed., Medical/Engineering by Prof. Shah Jahan Kahlun

BDS Integrated Curriculum 2K25

Version 01

Civics

1. MODULE RATIONALE

Civics is part and parcel of life and the study of Civics has major thrust on improvement of the quality of life and welfare of human beings. This discipline enhances the approach towards rational behavior and daily life.

There is a need for us to know role of a citizen with specific reference to Global Village, the Citizen and Daily life issues, Citizenship, Rights and Responsibility, Role of Government and State, Implementation

Issues of Devolution plan, Social Welfare Institutions/ NGOs and their role at basic level, social interactions and the new discoveries in IT and mass media, relations with International Organizations and Pakistan and its neighbors. Civics goes beyond the cognitive level to deal with social values and attitudes. From the earliest stages of the course, it is important to respect students' opinions while helping them to develop a rationale for their opinions. This curriculum is adapted from Agha Khan University Examination Board curriculum for higher secondary examination.

2. VISION & MISSION

2.1: Vision: Building the personality and character of health professionals

2.2: Mission: Teaching Civics to undergraduate students of Health Sciences, building their personality and character, enabling them to apply these principles in patient care.

3. CURRICULUM DESIGN AND ORGANIZATION (Total Hours = 30)

3.1: Course Aim:

- To develop understanding of the social nature and significance of civics, its key concepts and civic life.
- To emphasize learning of related themes in a way that encourages creativity, curiosity, observation, exploration and questioning.
- To create awareness of the nature of civic life and the relationship between civics and other social sciences.
- To promote understanding about the ideology of Pakistan and the struggle of an independent state.
- To inculcate the behavior patterns of national character, and qualities of a good citizen,
- self-reliance, patriotism and leadership.
- To create a strong sense of national unity, integration and cohesion.

- To prepare students as future citizens, conscious of their positive role in a society and the world at large.

3.2: Mode of Delivery: The module will be taught in the form of interactive lectures.

3.3: Learning Experience: Classroom environment will be used.

3.4: Attendance: Eighty-five percent (85%) attendance is mandatory to be eligible to sit in the professional examination.

3.5: Assessment: The assessment will be done through two written assignments and two quizzes per year. The assignments will be based on the topics discussed during the year. One will be given after first half of the course will be completed for the year and second will be given at the completion of the course.

3.7: Module Faculty: At least one full time faculty member (Lecturer or above) will be hired to run the civics course throughout four years. The qualifications of the faculty member will be certified by the academic council of the college/institution to be declared as the teacher of civics.


SYLLABUS

LEARNING OUTCOMES	TOPICS
i. Define civics ii. Describe how civics can improve the citizenship iii. Illustrate the scope of civics iv. Discuss the nature of civics v. Give examples how civics can help in the national development	Civics-Meaning & Nature
i. Examine the significance of civics ii. Explain how civics is important to know the problems of daily life iii. Discuss how civics can help to bring improvements in the civics life of citizens iv. Evaluate how civics can improve the sense of love and respect for human relationship v. Discuss that studying civics can develop a sense of gratitude vi. Give examples how civics is important to develop the global unity	Significance and Utility
i. Compare civics with political science, history, economics, sociology and ethics	Relationship with Social Sciences
i. Describe the term harmonic relationship ii. Explain the harmonic relationship among different members of society. (Women, children and senior citizens) iii. Explain how harmonic relationship develop for respect of religion	Harmonic Relationship
i. Define the term individual in relation to civics ii. Define the term state iii. Explain the relation between an individual and a state iv. Describe the importance of an individual in a state v. Enlist the responsibilities of an individual in a state	Individual and state
i. Identify the basic unit of social institution Discuss and characterize the different types of family ii. Give the importance of basic unit of social institution in the development of a state Enlist the responsibilities of family in general iii. Analyze your role for the betterment of the family Compare and contrast the impact of the deterioration of family in the western society and give examples	Family

i. Define community ii. Explain the nature and significance of community iii. Discuss the role of a family in community iv. Analyze the role of an individual for the betterment of the community	Community
i. Define society ii. Elaborate the relation between an individual and society and society and state iii. Analyze the role of an individual for the betterment of society	Society
i. Define the term nation, nationality and ummah differentiate between nation and nationality distinguish between nation and ummah analyze the value, behavior and the pattern of society based on religions ii. Evaluate the characteristics of society developed by religions	Nation, Nationality
i. Trace the origin of state with reference to the theories of Divine Origin, Force and Social ii. Contract (Hobbs, Lock, Rousseau) iii. Describe the elements of a state (sovereignty, population, territory, Government) iv. Compare and distinguish the role of state, society and government	Origin and elements of State
i. Describe the functions of state ii. Describe the factors which are necessary for proper functioning of state iii. Analyze the situation when a state does not function properly iv. Describe the characteristics of a welfare state Analyze how a welfare state guarantees the equity and justice on the issues of gender, religion, and social classes	Functions of state. (Defense, law and order, welfare etc.)
i. Define the concept of sovereignty in west ii. Discuss different kinds of sovereignty iii. Explain Austin's concept of sovereignty iv. Analyze critically Austin's concept of sovereignty	Sovereignty

BDS Integrated Curriculum 2K25

Version: 01

SECTION 05

PRISME

University of Health Sciences Lahore

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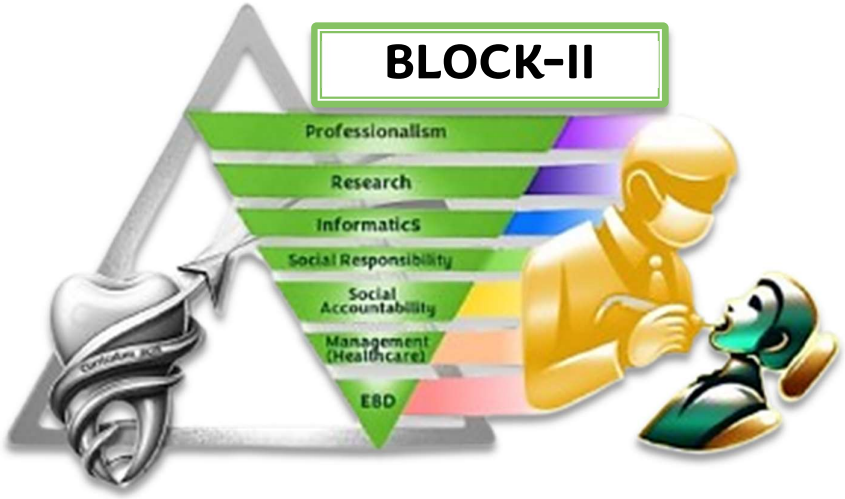
Version 01


BLOCK-II
Professionalism
Research
Informatics
Social Responsibility
Social Accountability
Management (Healthcare)
EBD

BLOCK II

Domain	Topic & References	Integrated Subjects	Learning Objectives
		Hours= 30	
Professionalism	**Introductory Lecture:** **Introduction to Professionalism and its Attributes** (AMEE guide 61)	Behavioral Sciences	Define Professionalism Discuss Different Attributes of Professionalism
	Ethics and Morals in Dentistry GDC Professional Standards: https://standards.gdc-uk.org/ PM&DC Ethical Guidelines Articles from Academic Medicine on Professionalism in Health Education IPEC Core Competencies: https://www.ipecollaborative.org/ipec-core-competencies FGDP: https://www.fgdp.org.uk/ ADEA Competencies: https://www.adea.org/professionalism ADEA Resources: https://www.adea.org/ethics ADC Professional Competencies:https://adc.org.au/files/accreditation/competencies/ADC_Professional_Competencies_of_the_Newly_Qualified_Practitioner.pdf Gibbs Reflective Cycle Guide: Creately – Gibbs Cycle	Behavioral Sciences	Understand and describe ethical codes (GDC, ADA, PM&DC)
Research Reference Book: Text Book of Preventive & Community Dentistry (S.S Hiremath 2nd Edition	Introduction to Research (Part IV: Pg 508)	Community Dentistry & Public Health	Define research and its types Explain the need for research in healthcare Recognize research applications
	Types of Research (Part IV: Pg 508)	Community Dentistry & Public Health	Distinguish between qualitative and quantitative research Define basic, applied, clinical, and translational research
	Research Cycle (Part IV: pg 508)	Community Dentistry & Public Health	Identify and describe key stages of the research cycle
	Literature Search I (Hands on)	Community Dentistry & Public Health / All subjects	Conduct effective literature searches through searching databases (PubMed, Google Scholar etc.)

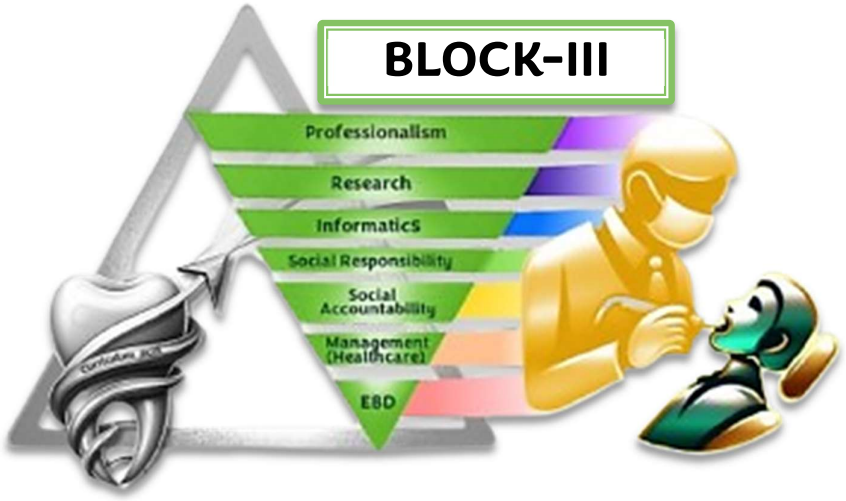
			Learn research through keywords and MESH terminologies
	Literature Search II (Hands on)	Community Dentistry & Public Health / All subjects	Conduct literature search in computer lab (By the students) Conduct effective literature searches through searching databases (PubMed, Google Scholar etc.) Learn research through keywords and MESH terminologies
	Literature Review I IMRAD article: Resource: How to critically appraise a research paper (Derek Alderson)	Community Dentistry & Public Health / All subjects	Identify the structure of research article (IMRAD) Critically review scientific papers (Observational Studies only). Identify problem and gap in scientific literature
	Literature Review II	Community Dentistry & Public Health / All subjects	Critically review scientific papers (Observational Studies only). Identify problem and gap in scientific literature
	Assessment I	Community Dentistry & Public Health / All subjects	Conduct Mock exercise of literature review to be carried out led by faculty *(To be attended by all research proposal/ synopsis supervisors for second year BDS)*
Informatics	**Define** informatics and differentiate it from IT, data science and computer science		Introduction to Informatics
	Describe the data-information-knowledge-wisdom (DIKW) hierarchy using dental examples		
	Explain how informatics supports evidence-based practice and patient-centered care in dentistry.		
	Define Artificial Intelligence.		Foundations of Artificial Intelligence (non- coding)
	Enlist the types of Artificial Intelligence (AI) based on capabilities and functionality		
	Define Generative AI and which Category of Artificial Intelligence does it belong?		
	Define and Enlist Types of Generative AI i.e. Single Modality Generative AI and Multimodal Generative AI Model along with Examples		

	Compare and Contrast between Large Language Models (LLM) and Large Multimodel Models (LMM). Also compare both the models with conventional rule base AI.		
	Describe World Health Organization's ethical principles for AI in health. https://www.who.int/news/item/28-06-2021-who-issues-first-global-report-on-ai-in-health-and-six-guiding-principles-for-its-design-and-use https://iris.who.int/bitstream/handle/10665/341996/9789240029200-eng.pdf?sequence=1		Ethical, Social and Legal Implications of AI
	• Explain the principles and applications of Artificial Intelligence (AI) in various dental specialties, and evaluate its current use in diagnostic and clinical practices, particularly in low- and middle-income countries (LMICs). • Critically assess the challenges, ethical considerations, and future opportunities for integrating AI into dental education and practice in LMIC settings. https://bmcoralhealth.biomedcentral.com/articles/10.1186/s12903-024-03970-y		
	Explain cognitive-load limit and **recognise** at least three cognitive-load pitfalls in slide design (extraneous text, visual clutter, distracting animations).		Fundamental Principles & Psychology of Presentation
	List and explain the core design rules for slide decks 1. 6 × 6 Rule 2. One Idea per Slide 3. High Contrast 4. Readable Fonts 5. Consistent Visual Hierarchy 6. Balanced Whitespace 7. Quality Imagery over Text 8. Colour-Blind–Safe Palette 9. Minimal Animation Accessible Content		
	Describe the psychological principles that affect legibility, including appropriate font size, dyslexia-friendly typefaces, and optimal line spacing.		
	Explain how colour psychology influences audience attention, emotion, and memory during a presentation.		

	Outline and illustrate the multimedia-learning principles of dual coding, signalling, and segmenting as methods for turning a cluttered slide into an audience-friendly format.		
	Describe the components of visual hierarchy (titles, headings, call-outs) that guide audience gaze across a three-slide sequence.		
	Distinguish between decorative and informative graphics, noting which add genuine cognitive value		
	Discuss common cues of audience disengagement and suggest straightforward remedies based on presentation-psychology insights.		
	Identify key interface elements (Ribbon, Quick-Access Toolbar, status bar). • **Recognise** the difference between character and paragraph formatting. **List** common document layout tools (page breaks, margins, orientation). **Describe** how to insert and caption basic objects (tables, pictures). **Demonstrate** saving, exporting to PDF and printing a document.		Microsoft Word Fundamentals
	PRACTICALS **Generate** a patient-friendly post-op instruction sheet via Gen-AI with ≥90 % factual accuracy after peer-review. **Modify** the prompt to accommodate dyslexic patients (font & readability) and patients with low health literacy.		Generative AI
	Generateand**interpret** a basic frequency report (e.g., count of missing teeth) on DIKW hierarchy on Word Document with proper formatting of the draft.		Informatics
	Transform one *"busy"* slide from the PDF into a compliant version that integrates key design rules, colour codes, layout grid, accessibility, and multimedia-learning principle and **Run** MS Accessibility Checker and correct critical errors.		Fundamentals of Presentation
	Design and present on any topic related to the subjects being taught that integrates key design rules, accessibility, and multimedia-learning principle.		

	Critique a peer's slide deck for adherence to accessibility standards and provide constructive feedback.		
Social Responsibility, Cultural Sensitivity & Accountability including Ethics and Jurisprudence Reference HANDBOOK OF BEHAVIORAL SCIENCES BY MH RANA	**Introduction to Social Responsility Section D: Sociology and Anthropology** (p.125-141) • Sociology and Health • Anthropology and Health	Behavioral Sciences & DDE	Define the concept of social responsibility.
	Cultural Identity, Norms, and Beliefs in Oral Health Section D: Sociology and Anthropology (p.125-141) • Anthropology and Health Section E: Psychosocial Peculiarities of Dentistry (p.170)	Behavioral Sciences	Discuss the role of dentists in promoting social welfare through professional practice. Analyze how cultural backgrounds influence oral health beliefs and behaviors. Develop strategies for delivering culturally inclusive dental care.
	Understanding Social Determinants of Oral Health Section D: Sociology and Anthropology (p.125-141) • Sociology and Health Section E: Psychosocial Aspects of Health and Disease (p.143-174)	Behavioral Sciences	Define key social determinants affecting oral health. Explain the impact of income, education, and housing on oral hygiene behaviors. Identify social barriers to accessing oral health services. Apply real-world examples showing how non-clinical factors influence oral health behaviors.
	Community Participation, Mutual Respect, and Service Ethics Section B: Medical Ethics and Professionalism (p.36-61) • Professionalism in Health Care • Doctor-Patient Relationship Section D: Sociology and Anthropology (p.125-141)	Behavioral Sciences	Discuss the importance of mutual respect in community engagement. Describe ethical practices for health promotion in dentistry. Explain informed consent in the context of community dental outreach. Assess the role of cultural sensitivity in ethical community dental services.

	Dentist's Role in Public Advocacy Section B: Medical Ethics and Professionalism (p.36-61) • Responsibilities of the Doctor • Professionalism in Health Care	Behavioral Sciences	Identify the dentist's role in improving community oral health beyond clinical settings. Describe the impact of public education campaigns on oral health awareness. Highlight priority oral health issues requiring advocacy. Justify the dentist's role in shaping oral health policies for community benefit.
Management & Entrepreneurship	**Introduction to Management** Antoniadou, M. Leadership and Managerial Skills in Dentistry: Characteristics and Challenges Based on a Preliminary Case Study. Dent. J. 2022, 10, 146. https://doi.org/10.3390/dj10080146 Satwik, A. T. (2016). Practice management skills of graduating dental students entering the work force. Journal of Pharmaceutical Sciences and Research, 8(9), 1094.	DDE	Define basic management concepts and explain their relevance in a dental healthcare setting.
	Time Management https://www.ada.org/resources/practice/practice-management/office-hours and https://pubmed.ncbi.nlm.nih.gov/37208799/	DDE (Students Academic time management skills workshop)	Demonstrate techniques to manage academic time management


BLOCK-III
Professionalism
Research
Informatics
Social Responsibility
Social Accountability
Management (Healthcare)
EBD

BLOCK III

Domain	Topic & References	Integrated Subjects	Learning Objectives
		Hours= 30	
Professionalism	**Integrity & Respect** https://www.dentalprotection.org/uk/articles/professionalism-and-integrity	All subjects	Demonstrates academic honesty and respectful conduct
	Self-Directed Learner Resources: uwaterloo.ca/centre-for-teaching-excellence/catalogs/tip-sheets/self-directed-learning-four-step-process https://www.sciencedirect.com/science/article/pii/S0002945923016492	All subjects	To independently develop understanding and demonstration of professional patient communication by exploring relevant literature, observing role-model behavior in clinical environments, and reflecting on their interactions during simulated or observed patient encounters
	Accountability & Ethical Foundations Refer to institutional policy and case studies GDC Accountability Guidelines https://fdiworlddental.org/ethics-dentistry#:~:text=Accountability%20and%20veracity%3A%20Be%20truthful,promote%20the%20highest%20professional%20standards.	All subjects	Recognizes the importance of accountability in learning
Informatics	Define what a "Prompt" is in the context of generative AI and identify its role in influencing the model's response.		Foundations of Artificial Intelligence: Designing and Modulating Prompts in Generative AI: Principles, Types, and Parameter Control
	Explain how different types of prompts (instructional, role-based, and descriptive) affect the tone and content of AI outputs.		
	Identify and explain key parameters that are use when designing a prompt which influence AI-generated responses—temperature, top-k, top-p, max tokens, frequency penalty, and presence penalty—and how are they applied appropriately to control creativity, coherence, and specificity.		
	Identify and critically analyse the major risks posed by use of AI in healthcare—including hallucination, dataset bias, patient-data privacy breaches, lack of explainability (Black Box), automation bias, adversarial attacks, and model drift.		Ethical, Social and Legal Implications of AI
	List key mitigation strategies that help prevent hallucination, dataset bias, patient-data privacy breaches, lack of explainability (Black Box),		

	automation bias, adversarial attacks, and model drift		
	Demonstrate the ability to adjust at least three prompt modulation techniques (e.g., temperature, contextual framing, and presence penalty) in a generative AI tool (e.g., ChatGPT, DALL-E, or GPT-4o etc) to produce two accurate and context-appropriate visual or textual outputs related to oral histology or tooth morphology. (The workflow should illustrate Prompt → Model → Output)		Generative AI
	Write a clear, step-by-step plan for handling an ethical problem—such as being asked to create a fake radiograph with AI for a case report—showing how they would check the rules, seek guidance, and choose a safe and honest action and would comply with legal and ethical standards.		Ethics
Social Responsibility, Cultural Sensitivity & Accountability including Ethics and Jurisprudence Reference HANDBOOK OF BEHAVIORAL SCIENCES BY MH RANA	**Disparities, Fairness, and Policy Barriers** **Section D: Sociology and Anthropology** (p.125-141) • Sociology and Health • Anthropology and Health	Behavioral Sciences	Differentiate between equality and equity in dental care access. Compare rural and urban oral health challenges. Recommend strategies to promote fair and equitable dental services. Identify structural and policy barriers limiting access to dental care in underserved populations.
	Legal Foundations in Public Dental Practice **Section B: Medical Ethics and Professionalism** (p.36-61) • Rights and Responsibilities of Patients and Doctors • Guiding Principles of Medical Ethics	Behavioral Sciences	Articulate health as a fundamental human right. Explain confidentiality obligations in community dental programs. Summarize dentists' legal responsibilities during public health initiatives. Provide examples of patient legal protections in community dental services.
	Communication Skills https://citeseerx.ist.psu.edu/document?repid=re	To be integrated	Apply effective verbal and non-verbal

Management & Entrepreneurship	p1&type=pdf&doi=fd8e3e5d078260658a258d2c5570a7c6b4e15061 https://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-018-1174-6	and covered by Professionalism & Social Responsibility Domain	communication strategies to enhance clarity, teamwork, and decision-making in clinical and administrative dental settings.
	Introduction to Teamwork Learning in interprofessional teams: AMEE Guide no 38	DDE	Describe the characteristics of effective teams and basic communication strategies for collaboration.
Evidence Based Dentistry	**EBD Foundations** https://www.fdiworlddental.org/evidence-based-dentistry-ebd https://libguides.ecu.edu/c.php?g=836585&p=7650778	Community Dentistry	Define and explain the concept and importance of Evidence-Based Dentistry. Differentiate between levels of evidence and types of research (e.g., RCTs, cohort studies, case reports).

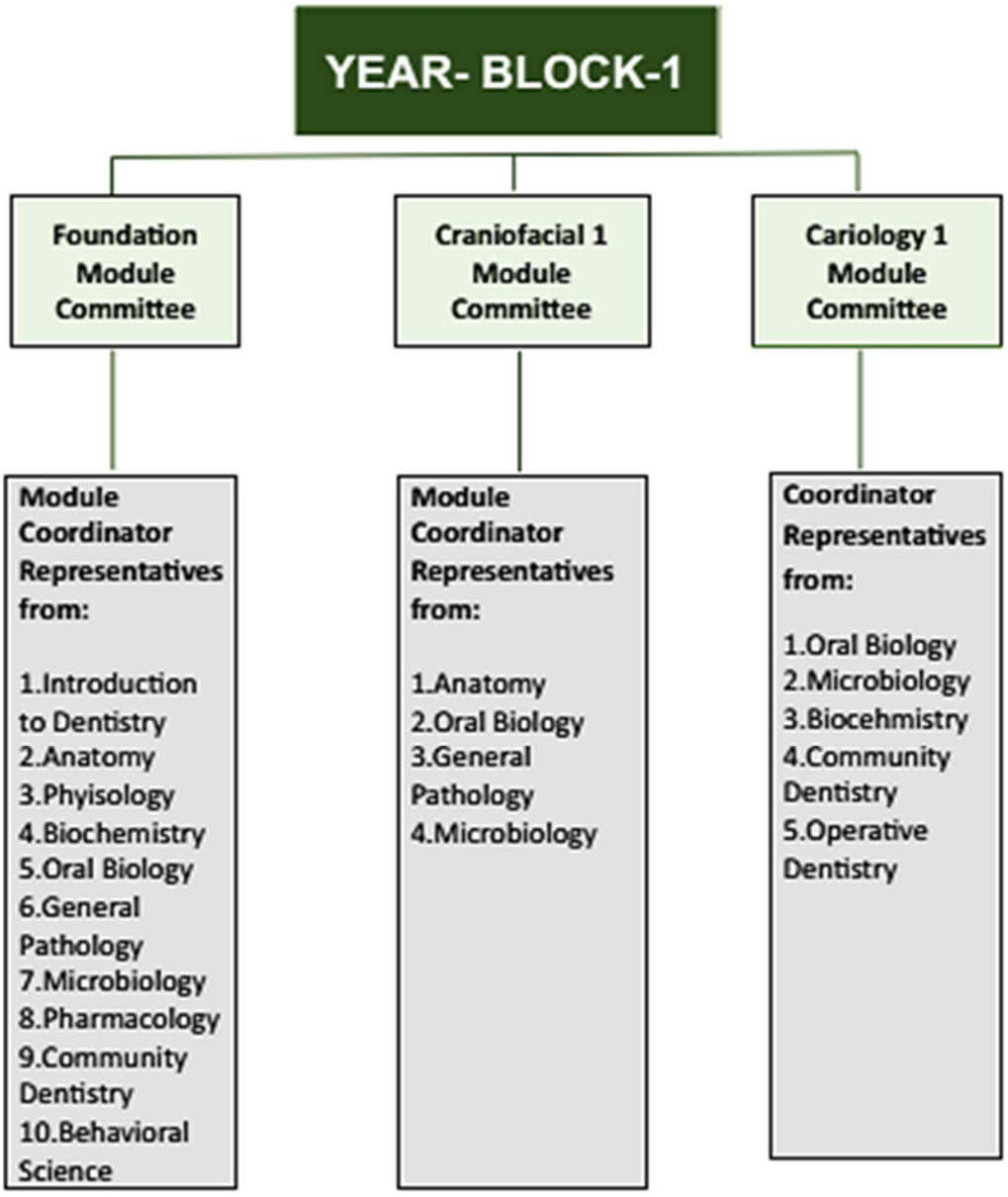
BDS Integrated Curriculum 2K25


Curriculum 2K25
BDS Integrated
Curriculum 2K25
INSTITUTIONAL IMPLEMENTATION
RECOMENDATIONS

RECOMMENDED IMPLEMENTATION SOPs

The implementation of the modular integrated approach requires to be categorical and methodical. It is recommended that the institutes should have an internal hierarchy for the smooth conduction of the educational process and for fine detailing the interpretation of the curricular guidelines.

A recommended organogram is given below:



A few recommended organizational titles and responsibilities are as follows:

YEAR COMMITTEE
• Identify the philosophy for implementing future Curriculum. • Ensures module requirements ahead of time. • Any adjustment of schedule if required. • Liaison with the chairperson of the mentoring program. • Quality assurance of teaching and learning. • Hold regular meetings. • Compliance to schedule and timetable. • Compliance to proposed internal assessment. • Oversee completion of Logbooks and Portfolio. • Oversee the foundation component of C-FRC. • Ensure student centeredness and feedback from students. • Develop timetables. • Analyze the implementation of current curriculum. • Strategize communication with both faculty and students.
MODULE COMMITEE
• Module committee should be headed by module coordinator. • The nomination of the 'Module Coordinator' will be based on the maximum content present in the respective module e.g., Musculoskeletal will have a module coordinator from Anatomy. • The coordinator will develop module team. • Collaboration and consultation with all the relevant departments. • Follow the curricular guidelines by the modules provided by UHS. • Coordinate with the Assessment Cell. • Arrange regular meetings. • Develop study guides in collaboration with the Department of Medical Education • Liaison with the PBL Committee. • PBL committee should be headed by PBL coordinator. • Responsible for coordination of the PBL meetings • Responsible for training of tutors by incorporating experiential learning, small

GROUP WORK AND CRITICAL REFLECTION

- The tutors must possess both content expertise and group facilitation skills.
- Forwarding the PBL to coordinator year committee / DME for the purpose of Quality assurance
- Ensure the teaching resources available for delivery of PBL.
- Quality assurance visits to the PBL site.
- Coordination with year committee head as well as Director Medical Education.

MENTORING COMMITTEE

- Design a mentorship program by establishing the idea and need for program to increase professional competence of students and interest in research and post-graduation.
- A senior faculty member with a keen interest in medical education and student affairs can chair the committee.
- Members of the committee include faculty from basic as well as clinical side voluntarily.
- Training of volunteer mentors through a workshop
- Assigning of mentorship groups (10-12 mentees per mentor)
- Build up a professional network for the mentees and personal growth.
- Improve their level of performance and satisfaction.
- Build relationships with colleagues and feel part of the community.
- Manage the integration of job, career, and personal goals.
- Regular monitoring of program and providing support to mentorship groups
- Evaluation every 6 months based on feedback from the faculty and students and individual performance of students.

DEPARTMENT OF MEDICAL EDUCATION

- The department of medical education serves as a backbone to provide effective and high-quality education to both undergraduate and post graduate medical and dental students.
- The Department of Medical Education needs to play the integral role in the implementation and adoption of **BDS Integrated Curriculum 2K25** *version 1.0*.
- DME will be overall responsible for the spirals of PERLs & C-FRC.

- DME will be monitoring the portfolio development by the students and the completion of logbook.
- DME will be responsible for developing a mentoring platform.
- Faculty development trainings for mentoring, reflective writing and portfolio development will be undertaken.
- Planning the affective training competency acquisition framework with the academic council will be the most pivotal role.
- Collaboration with other disciplines for the training sessions for different aspects of Professionalism, Ethics, Research and Leadership skills.

GENERAL RESPONSIBILITIES OF DME

- Contribute and design, train the trainer activities which fulfil the need for undergraduate and post graduate training.
- Shape and develop medical education research activities of the college.
- Facilitating & organizing workshops, seminars, symposia & conferences
- Conducting CME activities to leverage culture of awareness, journal club.
- Networking by representing the college, when needed, in national /international meetings or conferences.
- Student counseling
- Supervising students' academic progress
- Academic Committees Development and Support
- Staff Support and Development
- Curriculum development and reform
- Collaborate with curriculum committee and faculty members to develop quality instructional material such as modules, lecture, or study guides.
- Standard Operating Procedures for DME development
- Skill lab management
- Assessment analysis which includes blue printing, pre-exam review, item analysis and standard setting and provide feedback to concerned faculty and students on the learning outcome achievement.
- Develop and conduct periodical review of process of the program, learning and teaching activities, and assessment process.
- Identify opportunities for use of IT in teaching and learning, assessment and faculty development activities.

- Exam Cell management
- Quality Assurance Cell management
- Record keeping of departmental data.
- Leadership and management
- Participation in overall planning and management of teaching in liaison with the departments

INSTRUCTIONAL STRATEGIES

Delivery of a curriculum also needs a diversity of educational vernacular for the different learning styles. Following are a few of the recommended instructional strategies. It is advised that at least **three different methods of instructions** should be adopted in the institutional planning. This will enable the diversity of learning patterns to be facilitated.

Large Group Interactive Session (LGIS)
Lecture format is the most widely used approach to teaching especially in a large class size with average attention span of 20-30 mins. Interactive lecturing involves a two-way interaction between the presenter and the participants. Interactive methods like brainstorming, buzz group, simulation, role play, and clinical cases can be used. **Significance of its usage** • Relaxed environment, diverse opinions, active involvement • Increase attention and motivation. • Independence and group skills. • Cost effective. • Suitable for taking advantage of available audiovisual technologies.
Team based learning (TBL)
TBL is a uniquely powerful form of small group learning. It provides a complete coherent framework for building a flipped course experience. There are four essential elements of TBL which include: • Teams must be properly formed and managed (5-7 students) • Getting students ready • Applying course concepts • Making students accountable **Significance of its usage** • Students are more engaged. • Increased excitement in TBL classroom • Teams outperforms best members. • Students perform better in final and standardized exams.

Problem based learning (PBL)

It is an instructional student-centered approach in which students work in small groups on a health problem, identifying their own educational needs and being responsible for the acquisition of the knowledge required to understand the scenario.

Significance of its usage

- Teamwork
- Critical evaluation of literature
- Self-directed learning and use of resources
- Presentation skills
- Leadership
- Respect for colleagues' views

Tutorials

Tutorial is a class or short series of classes, in which one or more instructors provides intensive instruction on some subject to a small group. Its purpose is to explore students' point of view, allowing time for discussion, and inculcating self-directed, reflective learning skills.

Significance of its usage

- Develop and assess the extent of background knowledge of students, which enables them to properly understand concepts which may not have been understood in lectures.
- Develop problem-solving skills.
- Develop practice of self-learning.
- Reduced time to understand the topic.

Reflective Writing

It is a metacognitive process that occurs before, during and after the situation with the purpose of developing greater understanding of both the self and situation so that future encounters with the situation are informed from previous encounters.

Significance of its usage

- Questioning attitude and new perspectives.
- Areas for change and improvement.
- Respond effectively to new challenges.
- Critical thinking and coping skills

Bedside Teaching

Teaching and learning that occurs with actual patient as the focus. It occurs in wards, emergency departments, operating rooms, and high dependency units.

Significance of its usage

- Stimulus of clinical contact
- Psychomotor skills
- Communication skills
- Language skills
- Interpersonal skills
- Professional attitudes and empathy
- Role modelling

Laboratory Practical

Lab practical involve things like identifying a structure, a type of stain through a microscope, a problem with a preparation, reading biochemical test results and answering safety questions. These simulations allow students to attempt the experiments in the laboratory in a risk-free way that provides the opportunity to make mistakes and learn how to correct them using the immediate feedback generated.

Significance of its usage

- Enhance mastery of subject matter.
- Develop scientific reasoning.
- Develop practical skills.
- Develop teamwork abilities.

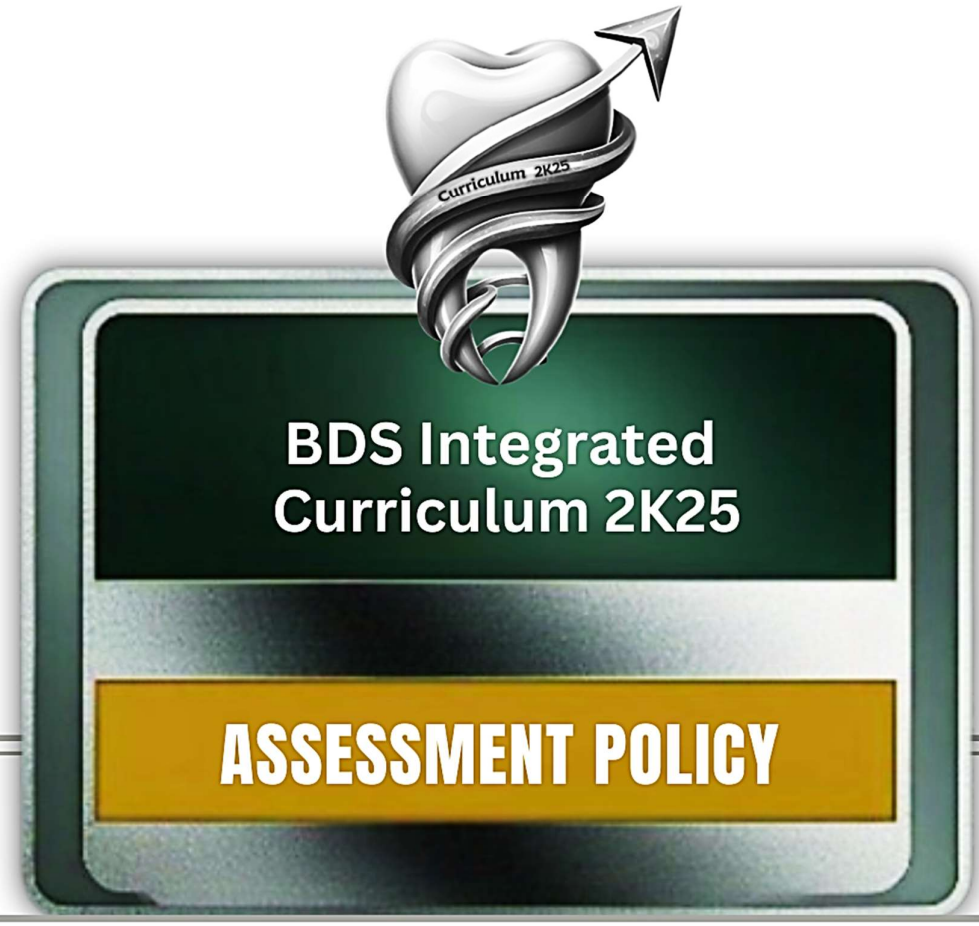
Demonstrations

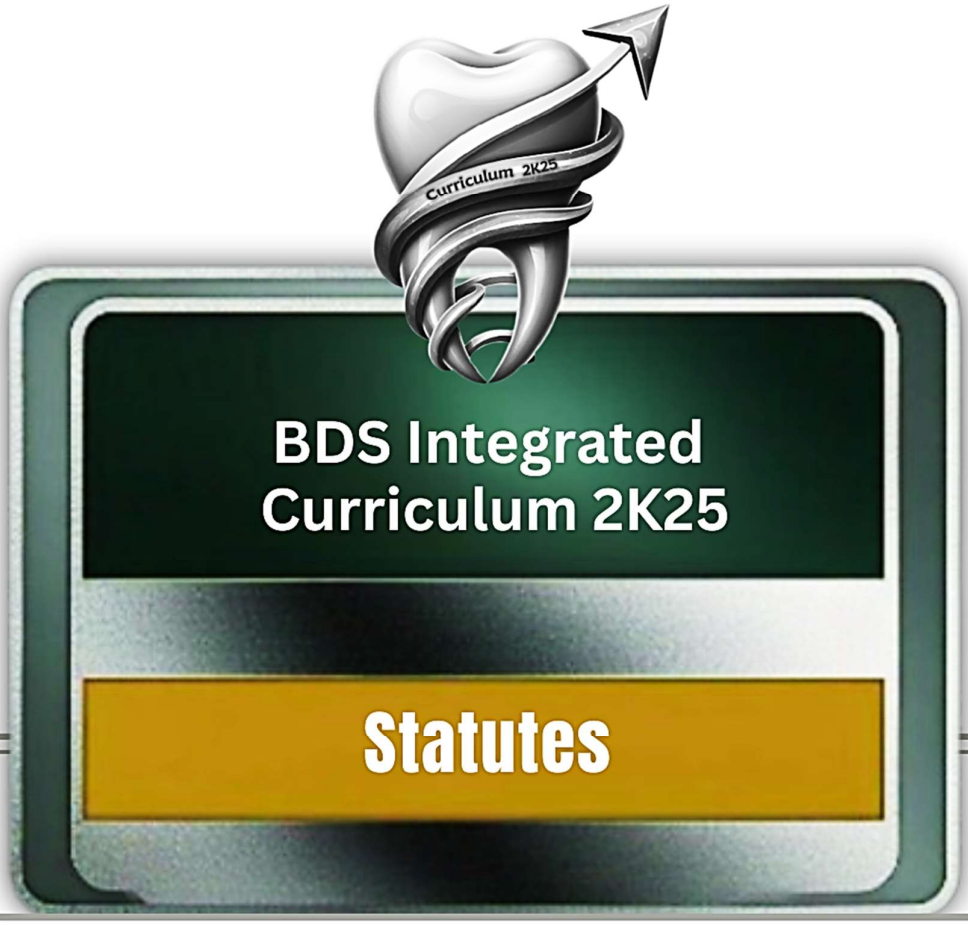
The demonstration method in teaching can be defined as giving a demo or performing a specific activity or concept. It is a teaching-learning process carried out in a very systematic manner.

Significance of its usage

- Promotes learning and correlates theory with practice.
- Sharpens the observation skills.
- Sustain interests in learning environment.
- Helps teacher to evaluate students' response

BDS Integrated Curriculum 2K25


Curriculum 2K25
BDS Integrated
Curriculum 2K25
ASSESSMENT POLICY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Curriculum 2K25
Statutes

Statutes

1. The First Professional BDS Examination shall be held at the end of the first year.

2. Every candidate shall be required to study contents of Anatomy (General Anatomy + Histology), Physiology, Biochemistry, Oral Biology & Tooth Morphology, Pharmacology & Dental Therapeutics, Microbiology, Community Dentistry & Public Health, General Pathology, Dental Radiology, Periodontology, Immunology Basics, Islamic Studies/ Civics and Pakistan Studies, PRISME Professionalism, Research, Informatics, Social Responsibility including Ethic and Jurisprudence, Management and Entrepreneurship including Leadership and Evidence Based Dentistry.

3. The teaching and assessment shall be done in three modular blocks.

4. There will be three papers in the first professional examination, and four papers in the second professional examination:

First Professional Exam:

   a. Paper I will be based on contents of Block 1;
   b. Paper II will be based on contents of Block 2;
   c. Paper III will be based on contents of Block 3;
   d. Paper IV will be based on contents of Islamic studies/Civics and Pakistan Studies

5. Each paper will comprise of two components “Written” and “Oral/Practical/Clinical” examinations.

6. The “Written” and “Oral/Practical/Clinical” examination in each paper will carry **150** marks each, making the total marks of **300** for each of the papers 1,2, and 3 (inclusive of Internal Assessment).

7. Total marks for the First Professional Examinations shall be **1000**, each. Marks of Islamic Studies/Civics and Pakistan Studies shall not be counted towards total marks of First Professional examination, and determination of position or merit of a candidate. However, the candidates failing in the subject of Islamic Studies/Civics & Pakistan Studies, while passing other subjects of 2nd professional examination, may not be subjected to detention, as the subject has no contribution towards total marks of any professional examination, and determination of position or merit. The students may rather be allowed to pass the examination in the subject, before appearing in their final professional MBBS examination, and in case of their failure to clear the subject they may not be allowed to take their final professional BDS examination.

8. Major content areas of the first two professional years shall be from:
   a. Anatomy including applied/clinical Anatomy;
   b. Physiology including applied/clinical Physiology;
   c. Biochemistry including applied/clinical Biochemistry;
   d. Oral Biology including applied/clinical Oral Biology;

9. Integrated clinical content areas of the both years include Tooth Morphology, Pharmacology & Dental Therapeutics, Microbiology, Community Dentistry & Public Health, General Pathology, Dental Radiology, Periodontology, Immunology, Oral Medicine / Prosthodontics, Foundation and PRISME.

10. Written Examination

a. The written component of Papers 1, 2, and 3 will consist of 'One-best-type' Multiple Choice Questions (MCQ)and Structured Essay Questions (SEQ)
b. Each MCQ will have five options (one best response and four distractors) and will carry one (**01**) mark.
c. There will be no negative marking.
d. There will be no sections within an SEQ, and it will be a structured question with five (**04**) marks each.
e. SEQ's will only be based on the major content areas of the year.
f. There will be total of **80** MCQs and **10** SEQs in every written paper in Papers1,2, and 3.
g. The duration of each written paper will be **190** minutes (**03 hours &10 min**).
h. The MCQ section will be of **80** minutes duration and the SEQ section of **110** minutes.

11. Oral/Practical/Clinical Examination

a. The 'Oral/Practical/Clinical' component of each Papers 1, 2, and 3 will consist of a total of twelve (12) OSPE/OSCE/OSVE stations in each 'Oral/Practical/Clinical' examination.
b. There will be Eight (08) Observed interactive OSVE (Objective Structured Viva Examination) from all subject areas. Each OSVE station will have a structured viva, to assess a practical component along with evaluation of the underlying principle relevant to that practical with a component of applied/practical knowledge and related clinical application.
c. Each OSPE/OSCE station will carry nine (09) marks.
d. Each OSVE station will carry sixteen (06) marks
e. Time for each OSPE. OSCE and OSVE station will be SIx (06) minutes.

12. Every candidate shall take the examination in the following Blocks (modules) in First Professional BDS Examinations: -

Paper	Block/s	Marks
I.	Block 1 (Foundation + Craniofacial-I + Cariology)	**300**
II.	Block 2 (Craniofacial-I + Neurosciences + Alveo-cemental complex)	**300**
III.	Block 3 (Blood & Cardiovascular system+ Gastrointestinal Tract + Occlusion-I)	**300**
IV.	Islamic Studies/ Civics + Pakistan Studies	**100**

A. Block 1 (Foundation + Craniofacial-I + Cariology)

The examination in Block 1 shall be as follows: -

I. One written paper of 120 marks having two parts:
   i. Part I shall have eighty Multiple Choice Questions (MCQs) of total 80 marks (01 mark for each MCQ) and the time allotted shall be 80 minutes. There will be no negative marking.

ii. Part II shall have ten(10) Structured Essay Questions (SEQs) of total 40 marks (04 marks for each SEQ) and the timeallotted shall be 110 minutes.

II. 'Oral/Practical/Clinical' examination shall have 120 marks in total.
III. The continuous internal assessment through '**Block Examination'**, conducted by the college of enrollment shall carry 60 marks, i.e., 20% of the total allocated marks (300) for the block. The scorewill be equally distributed to the Written and 'Oral/Practical/Clinical' Examinations.

B. **Block 2 (Craniofacial-I + Neurosciences + Alveo- cemental complex)**

The examination in Block 2 shall be as follows: -

I. One written paper of 120 marks having two parts:
   i. Part I shall have eightyMultiple Choice Questions (MCQs) of total 80 marks (01 mark for each MCQ) and the time allotted shall be 80 minutes. There will be no negative marking.
   ii. Part II shall have Ten(10) Structured Essay Questions (SEQs) of total 40 marks (04 marks for each SEQ) and the timeallotted shall be 110 minutes.

II. 'Oral/Practical/Clinical' examination shall have 120 marks in total.
III. The continuous internal assessment through '**Block Examination'**, conducted by the college of enrollment shall carry 70 marks, i.e., 20% of the total allocated marks (300) for the block. The scorewill be equally distributed to the Written and 'Oral/Practical/Clinical' Examinations.

C. **Block 3 (Blood & Cardiovascular system+ Gastrointestinal Tract + Occlusion-I)**

The examination in Block 3 shall be as follows: -

I. One written paper of 120 marks having two parts:
   i. Part I shall have eighty Multiple Choice Questions (MCQs) of total 80 marks (01 mark for each MCQ) and the time allotted shall be 80 minutes. There will be no negative marking.
   ii. Part II shall have Ten(10) Structured Essay Questions (SEQs) of total 40 marks (04 marks for each SEQ) and the timeallotted shall be 110 minutes.

II. 'Oral/Practical/Clinical' examination shall have 120 marks in total.
III. The continuous internal assessment through '**Block Examination**', conducted by the college of enrollment shall carry 70 marks, i.e., 20% of the total allocated marks (300) for the block. The scorewill be equally distributed to the Written and 'Oral/Practical/Clinical' Examinations.

D. **ISLAMIC STUDIES/CIVICS AND PAKISTAN STUDIES**

The examination in Islamic Studies/Civics and Pakistan Studies shall be as follows: -

I. One written paper of 100 marks in Islamic Studies/ Civics and Pakistan Studies having two components:
   i. The Islamic Studies/Civics component having total **60** marks. There will be three (3) Long Essay Questions (LEQs) to be attempted out of five (5), having 20 marks each.
   ii. Pakistan Studies component having total **40** marks. There will be two (2) Long Essay Questions (LEQs) to be attempted out of four (4), having 20 marks each.

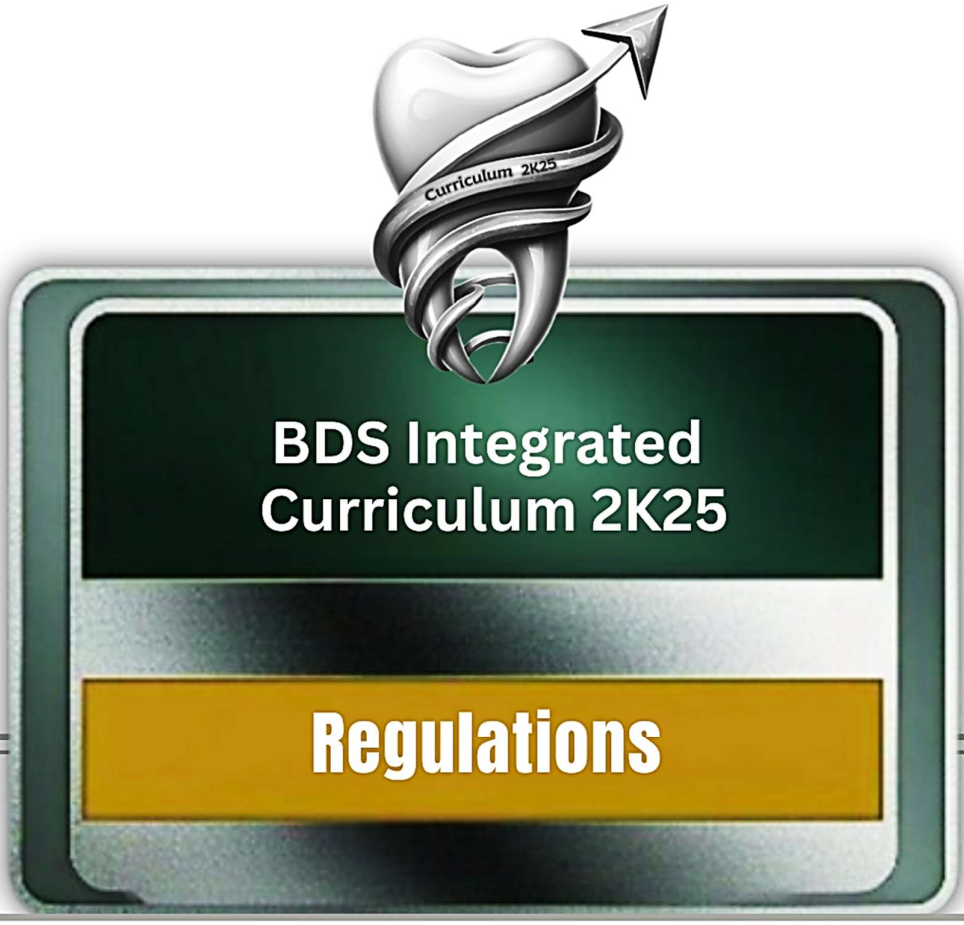
Note: Islamic Studies for Muslims, and Civics for Non-Muslims candidates.

13. The marks distribution in each subject is given in Table 1:

Table 1

YEAR-1						
Subject	**Theory**		**Practical**			**Total**
Block 1 **Modules** (Foundation + Craniofacial-I + Cariology)	Part I MCQs (80)	80 Marks	Practical / Clinical Examination	08 OSPE 08 OSVE	Marks 72 48	**300**
	Part II SEQS (10)	40 Marks				
	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		
	Total	**150**	Total	**150**		
Block 2 **Modules** (Craniofacial-I + Neurosciences + Alveo- cemental complex	Part I MCQs (80)	80 Marks	Practical / Clinical Examination	06 OSPE 02 OSCE 08 OSVE	Marks 54 18 48	**300**
	Part II SEQS (10)	40 Marks				
	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		
	Total	**150**	Total	**150**		
Block 3 **Modules** (Blood & Cardiovascular system+ Gastrointestinal Tract + Occlusion-I)	Part I MCQs (80)	80 Marks	Practical / Clinical Examination	07 OSPE 01 OSCE 08 OSVE	Marks 63 09 48	**300**
	Part II SEQS (10)	40 Marks				
	Internal Assessment 10%	30 Marks	Internal Assessment 10%	30 Marks		
	Total	**150**	Total	**150**		
Islamic Studies/ Civics and Pakistan Studies	**Islamic Studies/Civics** 3 LEQs of 20 marks each			60 Marks		100
	Pakistan Studies 2 LEQs of 20 marks each			40 Marks		
				Total Marks:		**1000**

12. No grace marks shall be allowed in any examination or practical under any guise or name.


Curriculum 2K25
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Curriculum 2K25
Regulations

Regulations

1. Professional examination shall be open to any student who: -
    a. has been enrolled/registered and completed one academic year preceding the concerned professional examination in a constituent/affiliated college of the University.
    b. has his/her name submitted to the Controller of Examinations, for the purpose of examination, by the Principal of the college in which he / sheis enrolled & is eligible as per all prerequisites of the examination.
    c. has his/her marks of internal assessment in all the Blocks sent to the Controller of Examinations by the Principal of the college along with the admission form.
    d. produces the following certificates duly verified by the principal of his / her college:
        (i) of good character;
        (ii) of having attended not less than cumulative 85% of the full course of lectures delivered and practical conducted in the particular academic session, while maintaining 75 % attendance in each block,
        (iii) Certificate of having appeared at the Block Examinations conducted by the college of enrolment with at least 65 % cumulative percentage in aggregate of blocks 1,2 and 3 for the 1st Year;
        (iv) Candidates falling short of block/s attendance shall not be admitted to the annual examination unless they take remedial classes to complete the requirement.

2. The minimum number of marks required to pass the professional examination for each paper shall be fifty-five percent (55%) in Written and fifty-five percent (55%) in the “Oral/Practical/Clinical” examinations and with an overall aggregate of **sixty-five percent (65%)**,at one and the same time.

3. Candidates who secure eighty five percent (85%) or above marks in any of the papers shall be declared to have passed “with distinction” in that Block, subject to having at least 80 % marks in the written component of that paper, concomitantly. However, no candidate shall be declared to have passed “with distinction” in any paper, who does not pass in all the papers of the Professional Examination as a whole at one and the same time.

4. A candidate failing in one or more paper of the annual examination and failing to appear in the annual examination shall be provisionally allowed to join the next professional class till the commencement of supplementary examinations. Under no circumstances, a candidate shall be promoted to the next professional class till he / she has passed all the papers in the preceding professional examination.

5. If a student appears in the supplementary examination for the first time as he/she did not appear in the annual examination because of any reason and fails in any paper in

the Supplementary Examination, he/she will be detained in the same class and will not be promoted to next class.

6. The colleges may arrange remedial classes and one re-sit for each block examination after approval from the Competent Authority.

7. The remedial classes and re-sit examination can be conducted during summer vacation/weekends, before or during preparatory leave, for the concerned professional examination, subject to the following conditions:
    i. At the completion of each block, the principals of the colleges shall submit a detailed report to the university, including cases of students with short attendance, poor performance/absence in the block examination along with the reasons and evidence for the same, proposed schedule for remedial classes and re-sit examination.
    ii. Competent Authority UHS will have the cause and the submitted evidence evaluated and documented, before permitting the colleges to arrange remedial classes and re-sit examination at the concerned block. No college is allowed to conduct remedial classes or re-sit examination without prior approval of the competent authority.
    iii. The students can appear in remedial classes / re-sit of a block examination, However, conduct of remedial classes shall be permitted only in the cases of students, who shall have attended at least 50 % of total attendance of the concerned block in the first instance.
        a. However, in special circumstances a student can be allowed to attend the 'remedial classes/re-sit exam' for a certain block, with the permission of the Competent Authority, to complete his/her requirement of attendance, even if the block attendance is less than 50%. In such cases, the evidence of reason will be provided by the college after the Principal has endorsed the case.
        b. The students who have attained a cumulative attendance of 85% directly or with remedial classes, can appear in the 'annual' professional examination.
        c. The valid reasons for short attendance in a block or absence from a block examination may include major illness/accident/surgery of the student or sickness / death of an immediate relative/being afflicted by a natural/man-made calamity or disaster or supplementary exam or detained students (missed the first block of the year) or UHS permitted late admission students

8. The application for admission of each candidate for examination shall be submitted to the Controller of Examination, through the Principal of the College, in a prescribed format, as per notified schedule, accompanied by the prescribed fee.

9. The marks of internal assessment through block/s exam and attendance shall be submitted to Controller of Examinations three times, within two weeks of completion of each block examination.

10. At the end of each block, the colleges are required to submit question papers and keys for the block examination (after block/s exam), internal assessment marks and attendance record to the Department of Examinations UHS. Further, parent-teacher

meetings shall be arranged by the colleges after every block examination to share feedback on the progress of students with their parents. Minutes of parent teacher meetings, study guides and block/s schedule/timetable shall be submitted to the Department of Medical Education UHS.

11. It is emphasized that fresh internal assessment or a revision of assessment for supplementary examination shall not be permissible. However, a revised internal assessment for the detained students can be submitted. The internal assessment award in a particular year will not be decreased subsequently detrimental to the detainee candidate. A proper record of the continuous internal assessment shall be maintained by the concerned department/s in the colleges.

12. The candidates shall pay their fee through the Principals of their respective Colleges who shall forward a bank draft / pay order / crossed cheque in favor of Treasurer, Universityof Health Sciences Lahore, along with their Admission Forms.

13. Only one annual and one supplementary of First Professional BDS Examinations shall be allowed in a particular academic session. In exceptional situations, i.e., national calamities, war or loss of solved answer books in case of accident, special examination may be arranged after having observed due process of law. This will require permission of relevantauthorities, i.e., Syndicate and Board of Governors.


Curriculum 2K25
BDS Integrated
Curriculum 2K25
TABLE OF SPECIFICATIONS
(ToS)

BDS Integrated Curriculum 2K25, 1st Professional Exam

BLOCK 1 – ASSESSMENT PARAMETERS AND DIVISION OF MARKS

Subject	Written Exam			Oral/Practical Exam			
	MCQ (1 mark and I minute each)	**SEQ** (4 marks each and 11 minutes for each SEQ)	**Marks**	**OSPE** (9 Marks Each and 6 minutes each)	**OSCE** (9 Marks Each and 6 minutes each)	**OSVE** (6 Marks Each and 6 minutes each)	**Marks**
Anatomy	13	2	**21**	2	0	1	**24**
Physiology	12	1	**16**	1	0	1	**15**
Biochemistry	9	1	**13**	0	0	1	**6**
Oral Biology	21	3	**33**	3	0	1	**33**
General Pathology & Microbiology	12	1	**16**	1	0	1	**15**
Pharmacology	7	1	**11**	0	0	1	**6**
Community Dentistry and Public Health	3	0	**3**	0	0	1	**6**
Oral Pathology / Operative Dentistry	3	1	**7**	1	0	1	**15**
Total Questions	**80**	**10**		**8**	**0**	**8**	
Net Total	**80x1=80**	**10x4=40**	**120**	**8x9=72**	**0**	**8x6=48**	**120**
Internal Assessment Marks*	**30**			**30**			
Grand Total	**150**			**150**			

Block 1 Internal Assessment for Theory Examination - 30 Marks		
Scoring Parameter	**Percentage Allocation**	**Marks Allocation**
Attendance in lectures*	20%	6
Block Examination (Theory)	50%	15
Continuous Assessment (Class Tests, Mock Exam, Assignments, Attitudes)	30%	9
Total	**100%**	**30**
* Attendance Marks will be according to the following criteria: 1. if 85 % = Eligible 2. if > 90% ≤ 93 % = 3 marks 3. if > 93% ≤ 95 % = 5 marks 3. if > 95% = 6 marks		
Block 1 Internal Assessment for Practical/ Tutorials Examination - 30 Marks		
Scoring Parameter	**Percentage Allocation**	**Marks Allocation**
Attendance in Practicals/ Tutorials*	20%	6
Block Examination (Practical/ Oral Examination)	50%	15
Continuous Assessment/ Log Books / Practical Notebooks/ Assignments / Attitudes	30%	9
Total	**100%**	**30**
* Attendance Marks will be according to the following criteria 1. if 85 % = Eligible 2. if > 90% ≤ 93 % = 3 marks 3. if > 93% ≤ 95 % = 5 marks 3. if > 95% = 6 marks		

BDS Integrated Curriculum 2K25, 1st Professional Exam							
BLOCK 2 – ASSESSMENT PARAMETERS AND DIVISION OF MARKS							
Subject	**Written Exam**			**Oral/Practical Exam**			
	MCQ (1 mark and I minute each)	**SEQ** (4 marks each and 11 minutes for each SEQ)	**Marks**	**OSPE** (9 Marks Each and 6 minutes each)	**OSCE** (9 Marks Each and 6 minutes each)	**OSVE** (6 Marks Each and 6 minutes each)	**Marks**
Anatomy	18	2	**26**	1	0	1	**15**
Physiology	14	2	**22**	0	1	1	**15**
Biochemistry	6	1	**10**	0	0	1	**6**
Oral Biology	14	2	**22**	2	0	1	**24**
General Pathology & Microbiology	12	1	**16**	1	0	1	**15**
Pharmacology	9	1	**13**	0	0	1	**6**
Community Dentistry/ Dental Radiology	3	0	**3**	1	1	1	**24**
Oral Pathology-Periodontology	4	1	**8**	1	0	1	**15**
Total Questions	**80**	**10**		**6**	**2**	**8**	
Net Total	**80x1=80**	**10x4=40**	**120**	**6x9=54**	**2x9=18**	**8x6=48**	**120**
Internal Assessment Marks*	**30**			**30**			
Grand Total	**150**			**150**			

Block 2 Internal Assessment for Theory Examination - 30 Marks		
Scoring Parameter	**Percentage Allocation**	**Marks Allocation**
Attendance in lectures*	20%	6
Block Examination (Theory)	50%	15
Continuous Assessment (Class Tests, Mock Exam, Assignments, Attitudes)	30%	9
Total	**100%**	**30**
* Attendance Marks will be according to the following criteria: 1. if 85 % = Eligible 2. if > 90% ≤ 93 % = 3 marks 3. if > 93% ≤ 95 % = 5 marks 3. if > 95% = 6 marks		
Block 2 Internal Assessment for Practical/ Tutorials Examination - 30 Marks		
Scoring Parameter	**Percentage Allocation**	**Marks Allocation**
Attendance in Practicals/ Tutorials*	20%	6
Block Examination (Practical/ Oral Examination)	50%	15
Continuous Assessment/ Log Books-Portfolio for PRISME / Practical Notebooks/ Assignments / Attitudes	30%	9
Total	**100%**	**30**
* Attendance Marks will be according to the following criteria 1. if 85 % = Eligible 2. if > 90% ≤ 93 % = 3 marks 3. if > 93% ≤ 95 % = 5 marks 3. if > 95% = 6 marks		

BDS Integrated Curriculum 2K25, 1st Professional Exam							
BLOCK 3 – ASSESSMENT PARAMETERS AND DIVISION OF MARKS							
Subject	**Written Exam**			**Oral/Practical Exam**			
	MCQ (1 mark and I minute each)	**SEQ** (4 marks each and 11 minutes for each SEQ)	**Marks**	**OSPE** (9 Marks Each and 6 minutes each)	**OSCE** (9 Marks Each and 6 minutes each)	**OSVE** (6 Marks Each and 6 minutes each)	**Marks**
Anatomy	10	1	**14**	1	0	1	**15**
Physiology	22	2	**30**	1	1	1	**24**
Biochemistry	6	1	**10**	0	0	1	**6**
Oral Biology	12	1	**16**	3	0	1	**33**
General Pathology & Microbiology	12	2	**20**	2	0	1	**24**
Pharmacology	17	1	**21**	0	0	1	**6**
Community Dentistry	0	1	**4**	0	0	1	**6**
Oral Pathology	1	1	**5**	0	0	1	**6**
Total Questions	**80**	**10**		**7**	**1**	**8**	
Net Total	**80x1=80**	**10x4=40**	**120**	**7x9=63**	**1x9=9**	**8x6=48**	**120**
Internal Assessment Marks*	**30**			**30**			
Grand Total	**150**			**150**			

Block 3 Internal Assessment for Theory Examination - 30 Marks		
Scoring Parameter	**Percentage Allocation**	**Marks Allocation**
Attendance in lectures*	20%	6
Block Examination (Theory)	50%	15
Continuous Assessment (Class Tests, Mock Exam, Assignments, Attitudes)	30%	9
Total	**100%**	**30**
* Attendance Marks will be according to the following criteria: 1. if 85 % = Eligible 2. if > 90% ≤ 93 % = 3 marks 3. if > 93% ≤ 95 % = 5 marks 3. if > 95% = 6 marks		
Block 3 Internal Assessment for Practical/ Tutorials Examination - 30 Marks		
Scoring Parameter	**Percentage Allocation**	**Marks Allocation**
Attendance in Practicals/ Tutorials*	20%	6
Block Examination (Practical/ Oral Examination)	50%	15
Continuous Assessment/ Log Books-Portfolio for PRISME / Practical Notebooks/ Assignments / Attitudes	30%	9
Total	**100%**	**30**
* Attendance Marks will be according to the following criteria 1. if 80 % = Eligible 2. if > 90% ≤ 93 % = 3 marks 3. if > 93% ≤ 95 % = 5 marks 3. if > 95% = 6 marks		

UNIVERSITY OF HEALTH SCIENCES LAHORE

UHS

BDS Integrated Curriculum 2K25

Version: 01

SECTION 08


Curriculum 2K25
BDS Integrated
Curriculum 2K25
LIST OF RESOURCES

Block 1: Learning Resources

Subject	Learning Resources
Oral Biology	1. Nanci, A. (2024). Ten Cate's Oral Histology, Development, Structure, and Function (10th ed.). Elsevier Health Sciences. 2. Berkovitz, B. K., Holland, G. R., & Moxham, B. J. (2017). Oral Anatomy, Histology, and Embryology (5th ed.). Elsevier Health Sciences. 3. Kumar, G. S. (2023). Orban's Oral Histology & Embryology (13th ed.). Elsevier Health Sciences. 4. Fuller, J. L. (4th ed.). Concise Dental Anatomy & Morphology. 5. Nelson, S. J. (2015). Wheeler's Dental Anatomy, Physiology and Occlusion (1st SAE).
General Anatomy, Histology & Embryology	1. Junqueira's Basic Histology: Text and Atlas (17th ed.) 2. Wheater's Functional Histology 3. Siddiqui, L. H. Medical Histology: Text and Atlas 4. General Anatomy by Laiq Hussain Siddiqui 5. Langman's Medical Embryology (15th ed.) 6. The Developing Human (10th ed.) by Moore et al.
Physiology	1. Guyton & Hall. Textbook of Medical Physiology (14th ed.).
Biochemistry	1. Harper's Illustrated Biochemistry (32nd ed.) by Rodwell et al. 2. Lippincott Illustrated Reviews: Biochemistry (8th ed.) by Abali et al.
Pathology & Microbiology	1. Robbins & Cotran Pathologic Basis of Disease 2. Review of Medical Microbiology and Immunology by Levinson 3. Textbook of Pathology by Walter & Israel
Pharmacology	1. Katzung & Trevor's Pharmacology Examination & Board Review (12th ed.) 2. Lippincott Illustrated Reviews: Pharmacology (7th ed.)
Community Oral Health	1. Textbook of Preventive and Community Dentistry by S.S. Hiremath 2. Community Oral Health by Cynthia Pine & Rebecca Harris
Oral Pathology	1. Contemporary Oral and Maxillofacial Pathology by Wysocki, Sapp & Eversole 2. Cawson's Essentials of Oral Pathology & Oral Medicine
Operative Dentistry	1. Sturdevant's Art and Science of Operative Dentistry 2. Summitt's Fundamentals of Operative Dentistry 3. Dental Caries: The Disease and Its Clinical Management by Fejerskov & Kidd

Behavioral Sciences	1. Hand book of Behavioral sciences, by MH Rana, 3rd ed. 2. Humayun A., Herbert M. (2010). Integrating behavioural sciences in healthcare. Islamabad: HEC.

Block 2: Learning Resources

Subject	Learning Resources
Physiology	1. Guyton & Hall. Textbook of Medical Physiology (14th ed.).
Anatomy	1. Snell's: Neuroanatomy 2. General Anatomy by Laiq Hussain Siddiqui
Histology	1. Medical Histology: Text and Atlas by Laiq Hussain Siddiqui
Biochemistry	1. Harper's Illustrated Biochemistry (32nd ed.) by Rodwell et al. 2. Lippincott Illustrated Reviews: Biochemistry (8th ed.) by Abali et al.
Pathology & Microbiology	1. Robbins & Cotran Pathologic Basis of Disease 2. Review of Medical Microbiology and Immunology by Levinson
Behavioral Sciences	1. Hand book of Behavioral sciences, by MH Rana, 3rd ed. 2. Humayun A., Herbert M. (2010). Integrating behavioural sciences in healthcare. Islamabad: HEC.

Subject	Learning Resources
Oral Biology & Tooth Morphology	1. Nanci, A. Ten Cate's Oral Histology, Development, Structure, and Function (10th ed.) 2. Berkovitz, B. K., Holland, G. R., & Moxham, B. J. Oral Anatomy, Histology, and Embryology (5th ed.) 3. Kumar, G. S. Orban's Oral Histology & Embryology (13th ed.) 4. Rajkumar, K. Oral Anatomy, Histology, Physiology & Tooth Morphology (2nd ed.)
Gross Anatomy	1. Snell's Clinical Anatomy by Regions (12th ed.)
Physiology	1. Guyton & Hall. Textbook of Medical Physiology (14th ed.)
Biochemistry	1. Harper's Illustrated Biochemistry (32nd ed.) by Rodwell et al. 2. Lippincott Illustrated Reviews: Biochemistry (8th ed.) by Abali et al.
Microbiology	1. Levinson, W. Review of Medical Microbiology and Immunology (16th ed.)
Pharmacology	1. Vanderah, T. W. Katzung's Basic & Clinical Pharmacology (16th ed.)
Behavioral Sciences	1. Hand book of Behavioral sciences, by MH Rana, 3rd ed. 2. Humayun A., Herbert M. (2010). Integrating behavioural sciences in healthcare. Islamabad: HEC.

Subject	Learning Resources
Oral Biology & Tooth Morphology	1. Nanci, A. Ten Cate's Oral Histology, Development, Structure, and Function (10th ed.) 2. Berkovitz, B. K., Holland, G. R., & Moxham, B. J. Oral Anatomy, Histology, and Embryology (5th ed.) 3. Orban's Oral Histology & Embryology (13th ed.) 4. Rajkumar, K. Oral Anatomy, Histology, Physiology & Tooth Morphology (2nd ed.)

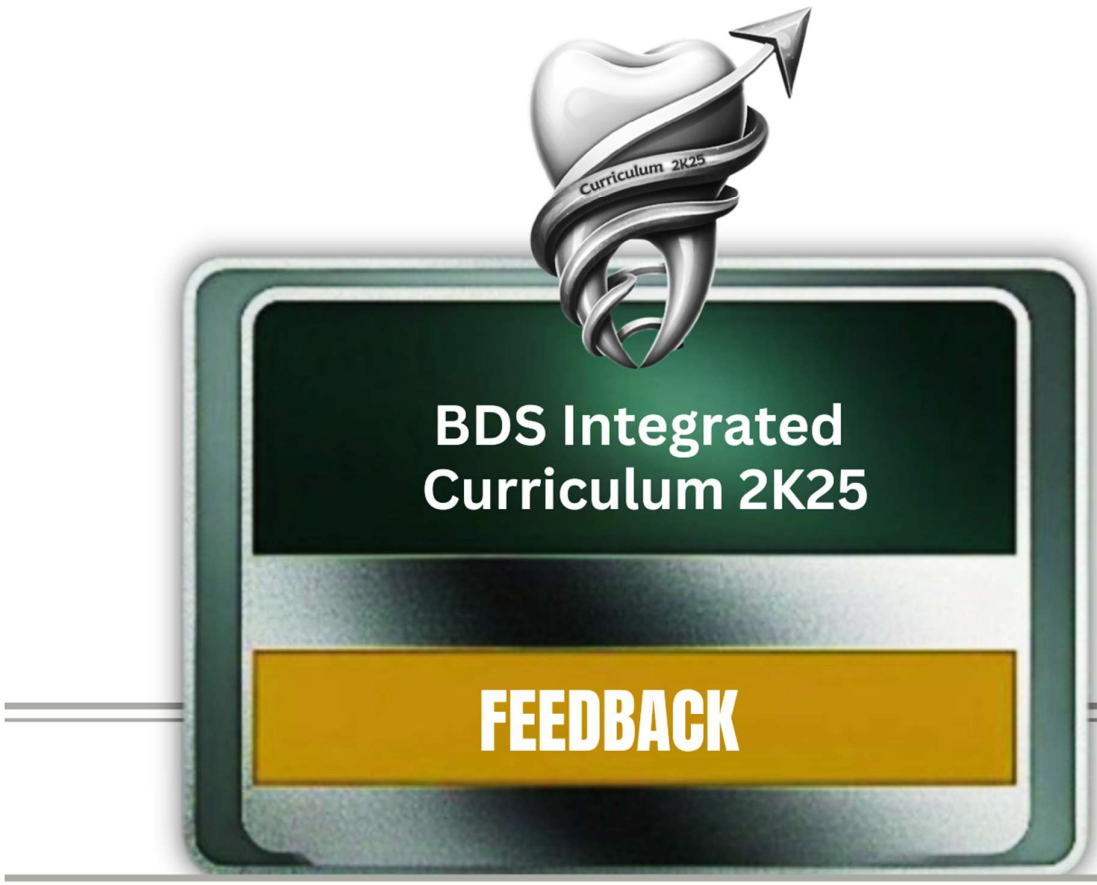
Block 3: Learning Resources

Subject	Learning Resources
Oral Biology & Tooth Morphology	1. Nanci, A. Ten Cate's Oral Histology, Development, Structure, and Function (10th ed.) 2. Berkovitz, B. K., Holland, G. R., & Moxham, B. J. Oral Anatomy, Histology, and Embryology (5th ed.) 3. Kumar, G. S. Orban's Oral Histology & Embryology (13th ed.) 4. Rajkumar, K. Oral Anatomy, Histology, Physiology & Tooth Morphology (2nd ed.)
Physiology	1. Guyton & Hall. Textbook of Medical Physiology (14th ed.)
Gross Anatomy	1. Snell's Clinical Anatomy by Regions (12th ed.)
Embryology	1. Langman's Medical Embryology
Histology	1. Siddiqui, L. H. Medical Histology: Text and Atlas
Biochemistry	1. Rodwell, V. W., et al. Harper's Illustrated Biochemistry (32nd ed.) 2. Abali, E. E., et al. Lippincott Illustrated Reviews: Biochemistry (8th ed.)
Behavioral Sciences	1. Hand book of Behavioral sciences, by MH Rana, 3rd ed. 2. Humayun A., Herbert M. (2010). Integrating behavioural sciences in healthcare. Islamabad: HEC.

Subject	Learning Resources
Histology	1. Siddiqui, L. H. Medical Histology: Text and Atlas
General Anatomy	1. Siddiqui, L. H. General Anatomy
Biochemistry	1. Rodwell, V. W., et al. Harper's Illustrated Biochemistry (32nd ed.) 2. Abali, E. E., et al. Lippincott Illustrated Reviews: Biochemistry (8th ed.)
Physiology	1. Guyton & Hall. Textbook of Medical Physiology (14th ed.)
Pathology	1. Kumar, V., et al. Robbins & Cotran Pathologic Basis of Disease (10th ed.)
Microbiology	1. Levinson, W. Review of Medical Microbiology & Immunology (18th ed.)
Pharmacology	1. Katzung & Trevor. Pharmacology Examination & Board Review (12th ed.) 2. Whalen, K. Lippincott Illustrated Reviews: Pharmacology (7th ed.)
Behavioral Sciences	1. Hand book of Behavioral sciences, by MH Rana, 3rd ed. 2. Humayun A., Herbert M. (2010). Integrating behavioural sciences in healthcare. Islamabad: HEC.

Resource Type	Learning Resources
Textbooks	1. Fuller, J. L. Concise Dental Anatomy & Morphology (4th ed.) 2. Nelson, S. J. Wheeler's Dental Anatomy, Physiology and Occlusion (1st SAE)
Reference Books	1. Woelfel's Dental Anatomy (Jones & Bartlett Learning) 2. Oral Biology and Tooth Morphology

BDS Integrated Curriculum 2K25


Curriculum 2K25
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FEEDBACK

Program Evaluation & Feedback

In continuation to the contextualization and development process undertaken by all the subject experts and stakeholders, the process of implementation is also vital. DME University of Health Sciences Lahore, considers the implementation segment of the entire continuum as the most vital and significant step. A curriculum is a live document and its viability dependence on the collaborative ownership of all the stakeholders. These stakeholders are inclusive of curriculum designers, students, faculty members, institutional administration, institutional leads, examiners, paper setters, question bank developers, PBL architects and program evaluators. To address such broad-based evaluation response UHS aims to keep the channel of feedback patent so that any possible glitch, omission, overlap, adjustment, or nuance could be addressed in a methodical manner.

A feedback proforma has been annexed which will also be available on the website. This if filled and routed through the channel mentioned below will be assessed at DME University of Health Sciences Lahore and then processed by the subject expert committee. In addition to the educationists at UHS we have module in charge and subject expert committees who can further process any recommendation or define a solution.

After the processing the recommended solution will be put up for approval by the Board of Studies before being conveyed across the board to the affiliated colleges and being implemented.

Curriculum Feedback/Suggestion Proforma

Name of the respondent / applicant
Title of the respondent / applicant (student/faculty member/ Principal)
Registration Number (or any official identification number)
Name of Department (in case of students mention year of entry)
Name of Institution
Observation / Impediment to training identified
Area of observation / Impediment **(content, theme, resources, instructional strategy, timetable, implementation, assessment, logbooks, clarity of instruction etc.)**

Any recommended solution:
Signature: _____ Name: _____ Date: _____

FOR OFFICE USE

Remarks by Director/HOD Medical Education

Signature Director Medical Education: _____

Name & Stamp: _____

Date: _____

Remarks by Principal

Signature: _____

Name & Stamp: _____

Date: _____

Department of Medical Education

University of Health Sciences Lahore

Innovating & Strategizing Healthcare Academia