BDS INTEGRATED CURRICULUM
2k25

1st Year BDS

(Session 2025-2026)

STUDY GUIDE
BLOCK-2

Module 4	Module 5	Module 6	Module 7
Foundation-II	Craniofacial-II	Neurosciences-I	Alveolo-cemental complex

Dental Section, MMDC Multan

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MISSION AND VISION OF UHS

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.

MISSION AND VISION OF MMDC

(Dental Section) MMDC Vision

To be a leading dental institution in South Punjab, recognized for excellence in education, research, and healthcare services, while developing competent and compassionate healthcare professionals and addressing health disparities through research and community-focused initiatives.

(Dental Section) MMDC Mission

To produce professionally competent and ethical dental graduates equipped with knowledge, clinical skills and technological competence to address emerging global health challenges through research, innovative educational approaches and lifelong learning.

PROGRAM OUTCOME

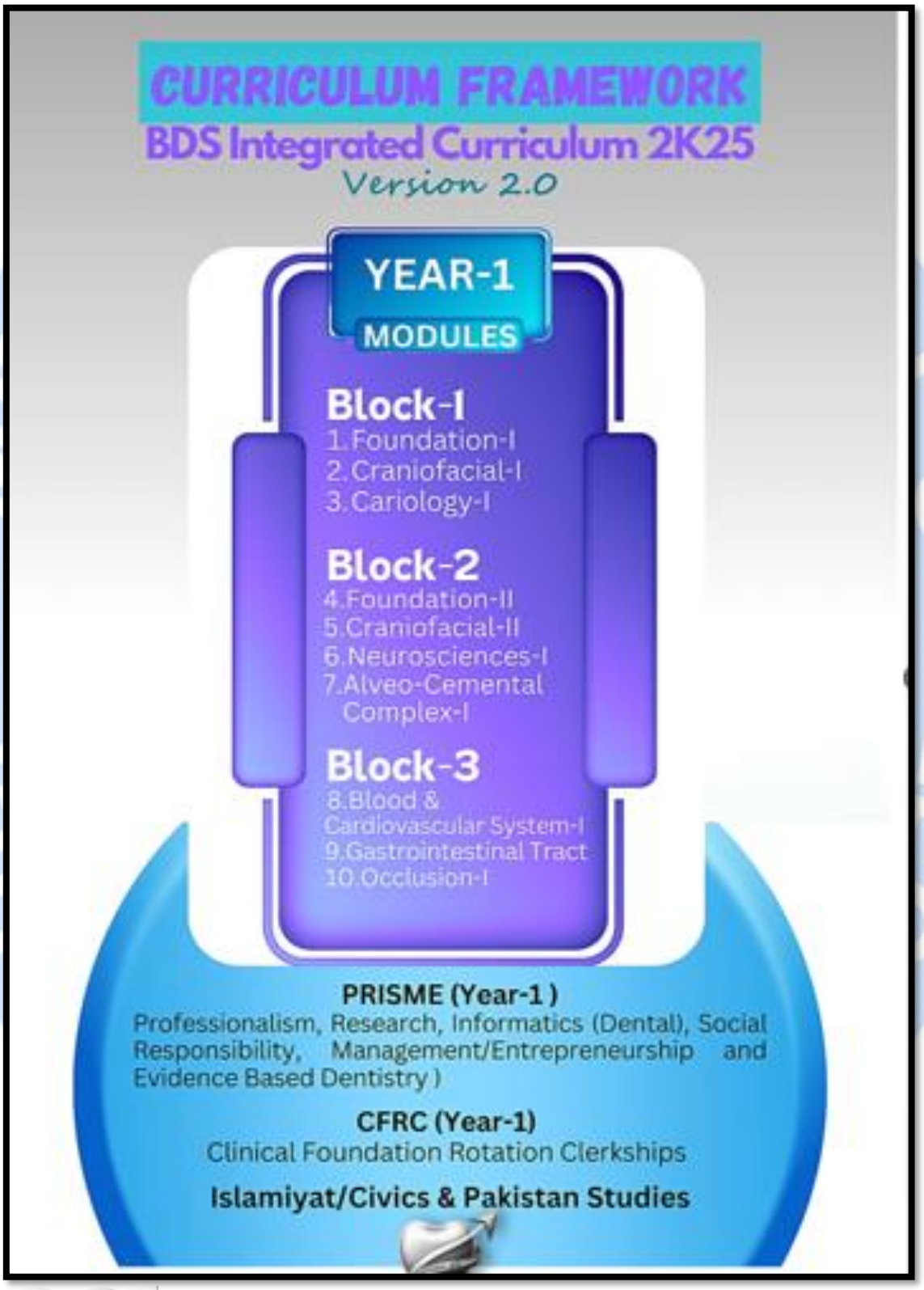
The students of Bachelor of Dental Surgery (BDS) of MMDC at the end of the program will be able to:

- Dental Graduates will apply the knowledge, skills and technological competencies to practice dentistry in primary care setting and provide comprehensive patient care.
- The graduates will promote dental health care within the community, utilizing the latest research, critical thinking and making evidence informed decisions and apply relevant evidence to address emerging oral and global health challenges.
- Dental graduates will uphold professional values and demonstrate emotional intelligence, social responsibility, and engage in lifelong learning, leadership, and innovation.

LIST OF ABBREVIATION

Abbreviations	Subjects
UHS	University of Health Sciences
BDS	Bachelor of Dental Surgery
PRISME	Professionalism, Research, Informatics, Social Responsibility and Accountability, Management & Entrepreneurship, Ethics Evidence Based Dentistry
MIT	Mode of information Transfer
AT	Assessment Tool
WHO	World Health Organization
A	Anatomy
AI	Artificial Intelligence
B	Biochemistry
GDC	General Dental Council
Ph	Pharmacology
P	Physiology
Pa	Pathology
OB	Oral Biology
OP	Oral Pathology
CD	Community Dentistry
OD	Operative Dentistry
AMIA	American Medical Informatics Association
AMEE	Association of Medical Education in Europe
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


CURRICULUM FRAMEWORK
BDS Integrated Curriculum 2K25
Version 2.0
YEAR-1
MODULES
Block-I
1.Foundation-I
2.Craniofacial-I
3.Cariology-I
Block-2
4.Foundation-II
5.Craniofacial-II
6.Neurosciences-I
7.Alveo-Cemental Complex-I
Block-3
8.Blood & Cardiovascular System-I
9.Gastrointestinal Tract
10.Occlusion-I
PRISME (Year-1)
Professionalism, Research, Informatics (Dental), Social Responsibility, Management/Entrepreneurship and Evidence Based Dentistry)
CFRC (Year-1)
Clinical Foundation Rotation Clerkships
Islamiyat/Civics & Pakistan Studies

INTRODUCTION TO STUDY GUIDE

As you enter the 1st year of your Bachelor of Dental Surgery (BDS) program, this study guide is designed to help you navigate this crucial stage of your education. It focuses on consolidating your knowledge, clinical skills, and preparing you for your future career in dentistry.

Objectives of BDS 1st Year:

- **Integration of Knowledge**: Reinforce and integrate the knowledge gained in previous years across all dental disciplines, including clinical dentistry, oral surgery, periodontology, prosthodontics, orthodontics, and pediatric dentistry.
- **Clinical Exposure:** Gain foundational understanding of clinical dentistry by observing real patient interactions and procedures. Emphasis is placed on recognizing diagnostic steps, treatment planning, and familiarizing them with clinical protocols.
- **Professional Development**: Enhance your understanding of the ethical, legal, and professional responsibilities of a dentist. Prepare for the transition from student to practitioner.
- **Exam Preparation**: Equip yourself with effective study strategies and resources to excel in final examinations and assessments.

ACADEMIC SCHEDULE OF BLOCK-2

Block-2 Start Date	8th June 2026
Block-2 Exam	28th Sep- 2nd Oct 2026
Block-2 Ends Date	25th September 2026

TIME TABLE

DENTAL SECTION, MULTAN MEDICAL & DENTAL COLLEGE, MULTAN

Time Table For 1st Year BDS (Session 2025-2026)

BLOCK-2 (Integrated Modular 2k25)

Day	08:30-09:30	09:30-10:20	10:20-11:10	11:10-12:00	12:00-12:50	12:50-1:20	01:20-02:10	02:10-03:00
Monday	Test	Test	Anatomy Interactive Lecture	Oral Biology Interactive Lecture	Physiology Interactive Lecture	Break	G. Pathology & Microbiology Interactive Lecture / SGD 6-11 (Week)	Pharmacology Interactive Lecture
Tuesday	Pharmacology Interactive Lecture	Biochemistry Interactive Lecture / SGD 6-11 (Week)	G. Pathology & Microbiology Interactive Lecture	Anatomy Interactive Lecture	Oral Biology Interactive Lecture		Physiology Interactive Lecture	Community Dentistry Interactive Lecture
Wednesday	Anatomy Interactive Lecture	Anatomy 1-4 Week Oral Biology 5-8 Week Physiology 9-12 Week	Biochemistry Interactive Lecture	Physiology Interactive Lecture	Oral Biology SGD		Anatomy Practical	PRISME Interactive Lecture
Thursday	Dental Radiology 1-4 Week Periodontology 5-8 Week Oral Pathology 9-12 Week	Biochemistry Interactive Lecture	Physiology SGD	Pharmacology Interactive Lecture	G. Pathology & Microbiology 1-5 Week Biochemistry 6-12 Week		Anatomy SGD	Islamiyat Interactive Lecture
Friday	Test	Anatomy Interactive Lecture	Physiology Practical	Oral Biology Interactive Lecture	G. Pathology & Microbiology Practical		Oral Biology Pracitcal	CFRC 1-6 Week Pak Study 7-12Week

COORDINATORS

BDS-1 Anatomy Year Coordinator	Prof Dr Faiza Mehboob
Dental Education/ Block Coordinator	Dr Hajra Talat

BLOCK-2 SUBJECT INCHARGES

Community Dentistry	Prof Dr Ejaz Hussain Sahu
Anatomy	Prof Dr Faiza Mehboob
Oral Biology	Dr Abu Bakar
Physiology	Prof Dr Maria Gill
Prosthodontics	Dr Nadia wajdan
Biochemistry	Dr Jamal
Pharmacology	Prof Dr Muhammad Ali
Oral Pathology	Prof Dr Basil Khalid
Periodontology	Prof Dr Nausheen Khan
Dental Radiology	Dr Faisal Asghar
General Pathology	Prof Dr Rizwan Akhtar
CFRC	DDE
Islamiat/ Quran/ Pak Studies	Usman Jan
PRISME **Domain Professionalism,** **Domain Social Responsibility, Accountability** **Domain Research** **Domain Management (Healthcare)** **Domain Informatics** **Domain EBD**	Behavioral Science Community Dentistry Clinical Prosthodontics Dental Education

MODULE NO. 4

FOUNDATION II

MODULE RATIONALE

The Foundation II module builds upon the basic biomedical concepts introduced in Foundation I, emphasizing the integration of anatomy, physiology, biochemistry, and pathology with oral biology and dental relevance. It focuses on understanding blood composition and functions, the vascular and nervous systems, tissue responses to injury, and early disease mechanisms. The module introduces key principles of microbiology, pharmacology, and dental radiology to establish a bridge between foundational medical sciences and their clinical applications in dentistry. Through theory and practical components, students develop the ability to connect normal structure and function with pathological and clinical outcomes—forming a strong base for subsequent clinical modules.

Module Outcomes

- Describe the organization and functional components of the vascular and nervous systems.
- Explain the composition, formation, and functions of blood and its cellular elements, including mechanisms regulating erythropoiesis.
- Interpret biochemical pathways related to hemoglobin synthesis, porphyrin metabolism, and red blood cell energy production, along with their clinical correlations.
- Describe the structure, formation, and age-related changes in dentin and pulp, and relate these to dental pathologies.
- Explain the basic pharmacological principles governing drug absorption, distribution, metabolism, and excretion, with relevance to dental therapeutics.
- Identify common cellular adaptations, inflammatory processes, and mechanisms of wound healing under light microscopy.
- Describe the structure, classification, and growth of microorganisms; explain principles of sterilization, disinfection, and infection control in dental settings.
- Relate oral microbiology concepts, such as biofilm formation and pathogenic mechanisms, to dental infections and antibiotic resistance.
- Interpret conventional dental radiographs to recognize normal structures and common developmental anomalies.
- Demonstrate safe laboratory practices, basic microscopy, staining techniques, and correct calculation
- of drug dosages in practical settings.

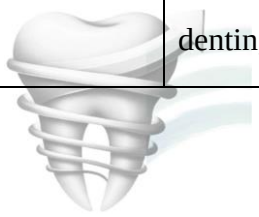
Subjects Integrated in the Module
• Physiology • Biochemistry • Oral Biology & Tooth Morphology • Pharmacology • & Therapeutics • General Pathology & Microbiology • Oral Pathology • Dental Radiology

THEORY

Biochemistry				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-B-001	Describe the structure of heme and briefly describe the steps of heme synthesis with its regulation.	Structure, Synthesis, and Functions of Hemoglobin	LGIS/ SGD	MCQs / VIVA
	Explain the metabolism of iron, including its absorption, transport (transferrin), storage (ferritin, hemosiderin), and regulation.		LGIS/ SGD	MCQs / VIVA
	How does heme combine with globin to form hemoglobin and enlist the functions of hemoglobin.		LGIS/ SGD	MCQs / VIVA
	Enlist the types of hemoglobin along with their percentage and chain composition.		LGIS/ SGD	MCQs / VIVA
	Understand the oxygen-binding mechanism of hemoglobin, including the concepts of cooperative binding and allosteric regulation.		LGIS/ SGD	MCQs / VIVA
	Describe hemoglobin structure, functions, and oxygen dissociation curve. Include hemoglobinopathies (sickle cell anemia, thalassemia).		LGIS/ SGD	MCQs / VIVA
	Explain the significance of HbA1c.		LGIS/ SGD	MCQs / VIVA
	Describe the structure and functions of myoglobin; compare and contrast with hemoglobin in terms of oxygen-binding and clinical relevance (MI marker).		LGIS/ SGD	MCQs / VIVA

F2-B-002	Define and explain the biochemical basis of porphyria along with its classification.	Porphyria	LGIS/ SGD	MCQs / VIVA
	Describe the oral and dental manifestations of porphyria, including erythrodontia, photosensitivity, mucosal lesions, and delayed healing.		LGIS/ SGD	MCQs / VIVA
F2-B-003	Describe RBC metabolism (glycolysis, pentose phosphate pathway, G6PD deficiency) and role of trace elements (iron, selenium).	Red Blood Cell Metabolism and Energy Pathways	LGIS/ SGD	MCQs / VIVA
	Explain RBC metabolism, including glycolysis, pentose phosphate pathway, and G6PD deficiency.		LGIS/ SGD	MCQs / VIVA
	Describe and outline the steps in hexose monophosphate pathway (HMP) and its significance in RBCs.		LGIS/ SGD	MCQs / VIVA
	Compare and contrast glycolysis and the HMP shunt.		LGIS/ SGD	MCQs / VIVA
	Explain hemolytic anemia due to pyruvate kinase and glucose 6 phosphate dehydrogenase deficiencies.		LGIS/ SGD	MCQs / VIVA
F2-B-004	Describe vitamins (A, B6, B9, B12, E), their active forms, sources, RDA, biochemical roles, and deficiency manifestations.	Vitamins	LGIS/ SGD	MCQs / VIVA

Oral Biology & Tooth Morphology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-OB-001	Describe the composition and functions of dentin and pulp; correlate structural features with clinical conditions.	Pulp–Dentin Complex	LGIS/ SGD	MCQs / VIVA
F2-OB-002	Explain the structure, functions, and degradation of extracellular matrix in oral tissues.	Extracellular Matrix	LGIS/ SGD	MCQs / VIVA
F2-OB-003	Describe the process of dentinogenesis.	Dentin	LGIS/ SGD	MCQs / VIVA
	Differentiate between the three main types of dentin: primary, secondary, and tertiary, and describe their locations and formation.		LGIS/ SGD	MCQs / VIVA
	Describe the mechanisms that control dentin mineralization, and differentiate between the pattern of mineralization in mantle dentin and circumpulpal dentin.		LGIS/ SGD	MCQs / VIVA
	Explain the processes of secondary and tertiary dentinogenesis, including the stimuli that trigger their formation.		LGIS/ SGD	MCQs / VIVA
	Describe the structure and function of dentinal tubules.		LGIS/ SGD	MCQs / VIVA
	Differentiate between peritubular and intertubular dentin, and explain their respective compositions and roles.		LGIS/ SGD	MCQs / VIVA
	Explain the formation and significance of sclerotic dentin and interglobular dentin.		LGIS/ SGD	MCQs / VIVA
	Describe the structural features of dentin, including incremental growth		LGIS/ SGD	MCQs / VIVA



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F2-OB-004	Describe the cellular contents and zones of the dental pulp.	Pulp	LGIS/ SGD	MCQs / VIVA
	Discuss the innervation, vascular supply, and lymphatic supply of the dentin–pulp complex.		LGIS/ SGD	MCQs / VIVA
	Explain the mechanisms of dentin sensitivity, focusing on the hydrodynamic theory.		LGIS/ SGD	MCQs / VIVA
	Describe the formation and clinical significance of pulp stones (denticles).		LGIS/ SGD	MCQs / VIVA
	Explain the age-related changes that occur in the dentin–pulp complex.		LGIS/ SGD	MCQs / VIVA
	Analyze the pulp's cellular response to dental caries and the mechanical trauma of cavity preparation.		LGIS/ SGD	MCQs / VIVA
F2-OB-005	Develop a detailed timeline chart illustrating the calcification stages and eruption periods for deciduous and permanent dentition.	Developmental Timeline and Chronology of Dentition	LGIS/ SGD	MCQs / VIVA
F2-OB-006	Describe the anatomy of the pulp tissue and pulp cavities in teeth.	Pulp Anatomy	LGIS/ SGD	MCQs / VIVA
F2-OB-007	Explain the age-related morphological and physiological changes occurring in the pulp cavity.	Age-Related Changes in the Pulp	LGIS/ SGD	MCQs / VIVA

Pharmacology & Therapeutics				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-Ph-001	Describe drug absorption and factors affecting it.	Drug Transport	LGIS/ SGD	MCQs / VIVA
	Describe drug distribution, including concepts of volume of distribution and plasma protein binding.		LGIS/ SGD	MCQs / VIVA
F2-Ph-002	Describe drug metabolism (biotransformation, first-pass metabolism, phase I and II reactions, enzyme induction & inhibition, clinical relevance).	Drug Metabolism	LGIS/ SGD	MCQs / VIVA
F2-Ph-003	Describe drug excretion, elimination, and clearance mechanisms (renal, biliary, other routes) and factors affecting them.	Drug Excretion	LGIS/ SGD	MCQs / VIVA
F2-Ph-004	Define half-life, loading dose, maintenance dose, and steady-state concentration; explain their clinical relevance.	Plasma Half-Life	LGIS/ SGD	MCQs / VIVA
F2-Ph-005	Define pharmacodynamics: dose-response relationships, graded vs quantal response. Draw dose response curves.	Pharmacodynamics	LGIS/ SGD	MCQs / VIVA
	Define receptors & describe types of drug receptors, cell signaling and mechanisms of receptor action. Describe the Phenomenon of down regulation and up regulation of receptors		LGIS/ SGD	MCQs / VIVA
	Explain Agonist & antagonists with its types. Differentiate between agonists, antagonists, and partial agonists with examples.		LGIS/ SGD	MCQs / VIVA

	Define therapeutic index and/or therapeutic window, and explain its clinical significance. Define Median Effective (ED50), Median Toxic (TD50) & Median Lethal Dose (LD50) and its clinical relevance.		LGIS/ SGD	MCQs / VIVA
F2-Ph-006	Illustrate various phases of Drug development. Describe Drug Interactions Identify factors that alter drug response (age, genetics, disease, pregnancy).		LGIS/ SGD	MCQs / VIVA
	Describe adverse drug reactions and their classification. Define Desensitization, Tachyphylaxis, Tolerance, Resistance, super sensitivity, hypersensitivity, super infection, iatrogenic effect, idiosyncrasy, and give examples.		LGIS/ SGD	MCQs / VIVA

General Pathology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-Pa-001	Describe intracellular accumulations (lipids, proteins, glycogen, pigments).	Intracellular Accumulatios and Calcification	LGIS/ SGD	MCQs / VIVA
	Define calcification; differentiate between dystrophic and metastatic calcification.		LGIS/ SGD	MCQs / VIVA
F2-Pa-002	Define pigmentation; describe endogenous (melanin, hemosiderin) and exogenous pigments (carbon, tattoos).	Pigmentation and Amyloidosis	LGIS/ SGD	MCQs / VIVA
	Define amyloidosis; describe pathogenesis and morphology.		LGIS/ SGD	MCQs / VIVA
F2-Pa-003	Define and explain cellular adaptations: atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia.	Cellular Adaptations	LGIS/ SGD	MCQs / VIVA
F2-Pa-004	Define aging; describe theories of aging and morphological features.	Aging	LGIS/ SGD	MCQs / VIVA
F2-Pa-005	Define acute and chronic inflammation and enlist cardinal signs.	Inflammation	LGIS/ SGD	MCQs / VIVA
	Enumerate the differences between acute and chronic inflammation		LGIS/ SGD	MCQs / VIVA
F2-Pa-006	Define wound healing (primary vs secondary intention).	Wound healing	LGIS/ SGD	MCQs / VIVA

Microbiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-Pa-007	Define microbes and describe their role in health and disease.	Introduction to Microbiology	LGIS/ SGD	MCQs / VIVA
	Differentiate between prokaryotic and eukaryotic microorganisms.		LGIS/ SGD	MCQs / VIVA
	Classify bacteria according to morphology and staining characteristics.		LGIS/ SGD	MCQs / VIVA
	Describe bacterial structure, spores, and growth curve.		LGIS/ SGD	MCQs / VIVA
	Describe the composition and types of culture media (selective, differential, enrichment).		LGIS/ SGD	MCQs / VIVA
	Compare and contrast applications of different culture media used in microbiology and oral diagnostic labs.		LGIS/ SGD	MCQs / VIVA
F2-Pa-008	Define aerobic and anaerobic growth and explain fermentation in oral bacteria.	Microbial Physiology and Genetics	LGIS/ SGD	MCQs / VIVA
	Discuss the role of iron metabolism in bacterial growth and virulence.		LGIS/ SGD	MCQs / VIVA
	Define mutation and its types; explain recombination.		LGIS/ SGD	MCQs / VIVA
	Discuss DNA transfer within and between bacterial cells (conjugation, transformation, transduction).		LGIS/ SGD	MCQs / VIVA
	Explain the mechanisms of bacterial resistance to antibiotics.		LGIS/ SGD	MCQs / VIVA
F2-Pa-009	Define sterilization, disinfection, cross infection and antisepsis.	Infection Control in Dentistry	LGIS/ SGD	MCQs / VIVA
	Describe common methods of sterilization and disinfection (physical and chemical).		LGIS/ SGD	MCQs / VIVA

	Explain the application of these methods in dental clinical practice to prevent cross-infection.		LGIS/ SGD	MCQs / VIVA
F2-Pa-010	Define normal flora, colonizer, and dysbiosis.	Normal Flora and Host Interaction	LGIS/ SGD	MCQs / VIVA
	Discuss the normal flora of different body sites, especially the oral cavity and skin.		LGIS/ SGD	MCQs / VIVA
	Describe their distribution, beneficial roles, and contribution to opportunistic infections.		LGIS/ SGD	MCQs / VIVA
F2-Pa-011	Define pathogen, pathogenesis, virulence factors, ID_{50}, and LD_{50}.	Bacterial Pathogenesis and Virulence	LGIS/ SGD	MCQs / VIVA
	Identify factors influencing microbial pathogenicity, including host and immune evasion mechanisms.		LGIS/ SGD	MCQs / VIVA
	Discuss principles and stages of bacterial pathogenesis.		LGIS/ SGD	MCQs / VIVA
	Explain determinants of pathogenesis: transmission, adherence, invasion, inflammation, toxin production, immune pathogenesis.		LGIS/ SGD	MCQs / VIVA
	Discuss the role of biofilm and glycocalyx in infections, particularly dental plaque and chronic oral infections.		LGIS/ SGD	MCQs / VIVA
	Enlist different bacterial strains that cause distinct diseases.		LGIS/ SGD	MCQs / VIVA
	Define typical stages of an infectious disease.		LGIS/ SGD	MCQs / VIVA
F2-Pa-012	Summarize the mechanism of action of major antimicrobial classes (e.g., β-lactams, aminoglycosides).	Antibiotic Agents	LGIS/ SGD	MCQs / VIVA
	Identify appropriate antibiotic agents for bacterial infections of dental relevance.		LGIS/ SGD	MCQs / VIVA
	Explain mechanisms of bacterial resistance and their implications in dental practice.		LGIS/ SGD	MCQs / VIVA

F2-Pa-013	Define osteomyelitis and list microorganisms commonly associated with it.	Oral Microbiology and Related Infections	LGIS/ SGD	MCQs / VIVA
	Discuss Actinomycetes with emphasis on epidemiology, virulence factors, and pathogenesis in cervicofacial infections.		LGIS/ SGD	MCQs / VIVA
F2-Pa-014	Describe the structure and classification of viruses (DNA and RNA).	Introduction to Virology	LGIS/ SGD	MCQs / VIVA
	Explain basic principles of viral replication and its clinical relevance in oral infections.		LGIS/ SGD	MCQs / VIVA
F2-Pa-015	Describe the structure and classify fungi.	Mycology	LGIS/ SGD	MCQs / VIVA

Oral Pathology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-OP-001	Describe developmental disturbances in dentin.	Dentinogenesis imperfecta	LGIS/ SGD	MCQs / VIVA
	Explain dentinogenesis imperfecta, regional odontodysplasia and dentin dysplasia (clinical, radiographic, histopathological).		LGIS/ SGD	MCQs / VIVA
F2-OP-002	Describe dentinal caries.	Dentinal Caries	LGIS/ SGD	MCQs / VIVA

Dental Radiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-DR-001	Describe the basic principles of dental imaging and its role in diagnosis.	Introduction to Dental Radiology	LGIS/ SGD	MCQs / VIVA
	Identify the types and indications of conventional radiographs, including periapical, bitewing, and orthopantomogram (OPG).		LGIS/ SGD	MCQs / VIVA

PRACTICALS / LAB WORK

Oral Biology & Tooth Morphology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-OB-008	Draw and label dentin types (primary, secondary, tertiary), tubules, pulp zones, odontoblasts, interglobular dentin, dead tracts, pulp stones.	Dentin & Pulp	Demonstration	OSPE
	Identify the dentin and pulp radiographically		Demonstration	OSPE
	Identify the Dento-enamel junction radiographically		Demonstration	OSPE

Pharmacology & Therapeutics				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-Ph-007	Calculate drug dose & rate of infusion and unit conversions (Posology).	Dose calculation	Demonstration	OSPE
	Apply dose calculation principles in labs.		Demonstration	OSPE

Pathology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-Pa-016	Identify cellular adaptations (metaplasia) in pictures.	Microscopic Identification	Demonstration	OSPE

Oral Pathology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-OP-003	Identify dentinogenesis imperfecta, pulp cavity, and dentin on radiographs.	Dentinogenesis Imperfecta	Demonstration	OSPE

Microbiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-Pa-017	Perform Gram staining on bacterial smears and identify Gram-positive and Gram-negative bacteria & ZN for MTB under the microscope.	Microscopic Identification	Demonstration	OSPE
F2-Pa-018	Demonstrate appropriate disinfection methods for dental instruments and materials.	Disinfection	Demonstration	OSPE
F2-Pa-019	Demonstrate appropriate sterilization methods (autoclave, dry heat, & moist heat) for dental instruments.	Sterilization	Demonstration	OSPE
F2-Pa-020	Identify culture media used in Microbiology laboratory for identification of pathogens (blood agar, chocolate agar, Mc Conkey agar, Nutrient agar, SDA, LJ medium, TSI, Citrate, Urease).	Culture Media	Demonstration	OSPE

Dental Radiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
F2-DR-002	Interpret basic dental radiographs to recognize normal anatomy and general radiological appearances of common pathology (radiolucency, radiopacity, and resorption).	Interpretation of Conventional Radiographs	Demonstration	OSPE

MODULE NO. 5
CRANIOFACIAL II

MODULE RATIONALE

Craniofacial II builds on foundational anatomical and physiological concepts introduced earlier, emphasizing the structure and function of the head and neck in relation to dental practice. The module integrates gross anatomy, physiology, biochemistry, and oral biology to provide students with a detailed understanding of cranial nerves, facial muscles, vascular supply, and sensory organs relevant to dentistry. Students also explore the physiology of nerve conduction and muscle contraction, as well as the biochemical and microscopic basis of muscle and bone integrity. Through dissections, laboratory work, and microscopic analysis, the module strengthens students' understanding of normal structure and function—laying the groundwork for clinical application, anesthesia, oral surgery, and pathology in later years.

Module Outcomes

- Describe the anatomy of the scalp, face, orbit, temporal, infratemporal, and pterygopalatine fossae, including their neurovascular and lymphatic components.
- Explain the anatomical basis and clinical significance of facial infections, scalp injuries, and fractures of the facial skeleton.
- Identify the muscles of facial expression, extraocular muscles, and muscles of mastication with their attachments, nerve supply, and actions.
- Describe the course, branches, and clinical implications of major cranial nerves, particularly the facial, trigeminal, oculomotor, trochlear, and abducent nerves.
- Explain the structure, vascular supply, and innervation of the ear, nose, paranasal sinuses, and their relevance in dental and ENT pathologies.
- Discuss the physiology of nerve impulse generation, conduction, and synaptic transmission, and relate these concepts to the mechanism of local anesthesia.
- Explain skeletal muscle structure and contraction, including the roles of sarcomere components, motor units, and energy systems in muscle physiology.
- Correlate biochemical pathways of energy production with muscle performance and fatigue, emphasizing ATP generation and glycogen metabolism.
- Describe the structure, composition, and function of collagen, elastin, and extracellular matrix in maintaining musculoskeletal integrity.
- Identify the microscopic structure of bone and explain the functions of osteoblasts, osteocytes, and osteoclasts in bone formation and remodeling.
- Demonstrate identification of major neurovascular structures and muscles in the head and neck on models or cadaveric specimens.
- Analyze histological slides of bone and muscle tissues, correlating microscopic features with physiological and biochemical functions.

THEORY

Subjects Integrated in the Module
• Physiology • Anatomy • Biochemistry • Oral Biology & Tooth Morphology • General Pathology & Microbiology

Gross Anatomy				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
CF2-A-001	List the layers of the scalp and describe their anatomical features, including neurovascular supply and lymphatic drainage.	Scalp	LGIS/ SGD	MCQs / VIVA
	Give anatomical justification of spread of scalp infections, profuse bleeding in superficial scalp lacerations, gaping of scalp wounds		LGIS/ SGD	MCQs / VIVA
	Define the routes of spread of infection from scalp to brain		LGIS/ SGD	MCQs / VIVA
F2-A-002	Enlist in tabulated manner the muscles of facial expression, giving their nerve supply and actions.	Face	LGIS/ SGD	MCQs / VIVA
	Describe the extracranial course, branches, and distribution of the facial nerve.		LGIS/ SGD	MCQs / VIVA
	Explain the causes and clinical consequences of damage to the nerve.		LGIS/ SGD	MCQs / VIVA
	Describe the vascular supply and lymphatic supply of face.		LGIS/ SGD	MCQs / VIVA
	Describe the danger area of face with it its clinical significance.		LGIS/ SGD	MCQs / VIVA
	Define the routes of spread of infection from face to brain		LGIS/ SGD	MCQs / VIVA
CF2-A-003	Define the boundaries and openings of orbital cavity. List the structures traversing these openings.	Eye	LGIS/ SGD	MCQs / VIVA
	In a tabulated manner enlist the extraocular and intraocular muscles of eyeball and eyelid muscles giving their nerve supply and actions		LGIS/ SGD	MCQs / VIVA
	List and define the movements of eyeball with special reference to the axis		LGIS/ SGD	MCQs / VIVA

	List the parts of Lacrimal apparatus giving their location and anatomical features. Describe the nerve supply of lacrimal gland		LGIS/ SGD	MCQs / VIVA
	Describe the extracranial course, distribution and branches of oculomotor, trochlear and abducent nerves. Describe the location, roots and distribution of ciliary ganglion		LGIS/ SGD	MCQs / VIVA
	Give the clinical correlates of nerves supplying the muscles of the eyeball		LGIS/ SGD	MCQs / VIVA
	Describe the course and branches of ophthalmic artery mentioning its origin and termination		LGIS/ SGD	MCQs / VIVA
	Give the anatomical structure of eyeball emphasizing its three coats and their neurovascular supply (including optic nerve and central retinal vessels).		LGIS/ SGD	MCQs / VIVA
CF2-A-004	Describe the boundaries contents and primary communications of temporal, infratemporal and pterygopalatine fossa	Temporal, Infratemporal and Pterygopalatine fossa	LGIS/ SGD	MCQs / VIVA
	Describe the location, roots and distribution of pterygopalatine ganglion		LGIS/ SGD	MCQs / VIVA
CF2-A-005	Describe the anatomical features and neurovascular supply of external ear	Ear	LGIS/ SGD	MCQs / VIVA
	Describe the boundaries, contents, neurovascular supply and communications of middle ear cavity		LGIS/ SGD	MCQs / VIVA
	Describe the anatomical features of auditory tube.		LGIS/ SGD	MCQs / VIVA
	Describe the parts, anatomical features and neurovascular supply of internal ear		LGIS/ SGD	MCQs / VIVA
	Describe the course and distribution of vestibulocochlear nerve		LGIS/ SGD	MCQs / VIVA
	Describe the anatomical features and neurovascular supply of external nose		LGIS/ SGD	MCQs / VIVA

CF2-A-006	Describe the boundaries of nasal cavity (nasal septum, lateral wall, roof and floor) with their anatomical features, olfactory and trigeminal nerve supply, and vascular supply.	Nose	LGIS/ SGD	MCQs / VIVA
	Discuss the clinical correlates of nose: Epistaxis, Foreign body in the nose.		LGIS/ SGD	MCQs / VIVA
CF2-A-007	Identify the paranasal sinuses (maxillary, frontal, ethmoidal, sphenoidal) and describe their location, neurovascular supply, relations, and drainage pathways.	Sinuses	LGIS/ SGD	MCQs / VIVA
	Explain the lining and basic functions of the paranasal sinuses.		LGIS/ SGD	MCQs / VIVA
	Relate the maxillary sinus to posterior maxillary teeth and discuss its clinical importance in dentistry (e.g., extractions, implants, sinus lift).		LGIS/ SGD	MCQs / VIVA
	Discuss the clinical features of sinusitis and its differentiation from odontogenic pain.		LGIS/ SGD	MCQs / VIVA
CF2-A-008	Classify fractures of the maxilla based on anatomical patterns (Le Fort classification)	Fractures	LGIS/ SGD	MCQs / VIVA
	Classify fractures of the mandible based on anatomical regions		LGIS/ SGD	MCQs / VIVA

Physiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
CF2-P-001	Describe the physiological anatomy of a neuron, including its structure and function.	Membrane Potentials and Action Potentials (Nerve)	LGIS/ SGD	MCQs / VIVA
	Enlist the neuroglia cells responsible for myelination in Central Nervous System (CNS) & Peripheral Nervous	Myelinated and Unmyelinated Nerve	LGIS/ SGD	MCQs / VIVA

CF2-P-002	System (PNS)	Fibers.		
	Enlist the steps of myelination in peripheral nervous system.		LGIS/ SGD	MCQs / VIVA
	Define Multiple sclerosis		LGIS/ SGD	MCQs / VIVA
CF2-P-003	Explain Nernst potential of Na & K.	Membrane Potentials	LGIS/ SGD	MCQs / VIVA
	Derive the Nernst equation.		LGIS/ SGD	MCQs / VIVA
	Explain the physiological basis of the Goldman equation and write the equation.		LGIS/ SGD	MCQs / VIVA
CF2-P-004	Describe the resting membrane potential of a nerve fiber and the role of various ion channels.	Resting membrane potential	LGIS/ SGD	MCQs / VIVA
	Discuss Role of different channels in calculating Resting membrane potential of a nerve fiber		LGIS/ SGD	MCQs / VIVA
CF2-P-005	Define Action potential and ionic basis.	Action Potentials	LGIS/ SGD	MCQs / VIVA
	Discuss the role of voltage-gated channels in generating action potentials		LGIS/ SGD	MCQs / VIVA
	Define threshold stimulus		LGIS/ SGD	MCQs / VIVA
	Define the All-or-None Law.		LGIS/ SGD	MCQs / VIVA
	Define absolute refractory period, and relative refractory period also mention their physiological basis. Discuss the effects of hypocalcemia on nerve excitability.		LGIS/ SGD	MCQs / VIVA

	Explain the mechanism of local anesthetics on nerve excitability		LGIS/ SGD	MCQs / VIVA
CF2-P-006	Explain the propagation of action potentials	Propagation of the action potential	LGIS/ SGD	MCQs / VIVA
	Define Saltatory conduction and its benefits.		LGIS/ SGD	MCQs / VIVA
	Explain mechanism of tetany		LGIS/ SGD	MCQs / VIVA
CF2-P-007	Describe the physiological anatomy of skeletal muscles	Contraction of Skeletal Muscle	LGIS/ SGD	MCQs / VIVA
	Describe the structure of Sarcomere		LGIS/ SGD	MCQs / VIVA
CF2-P-008	Explain general mechanism of skeletal muscle contraction (walk along theory)	General mechanism of muscle Contraction	LGIS/ SGD	MCQs / VIVA
CF2-P-009	Define and differentiate isotonic and isometric contraction with 2 examples of each	Characteristics of whole muscle Contraction	LGIS/ SGD	MCQs / VIVA
	Give physiological basis of tetanization and multiple fiber summation		LGIS/ SGD	MCQs / VIVA
	Define a motor unit and explain the mechanism of muscle contraction by illustrating the role of motor units in regulating force and precision of movement.		LGIS/ SGD	MCQs / VIVA
	Give physiological basis of Rigor mortis Explain muscle fatigue		LGIS/ SGD	MCQs / VIVA
	Describe physiology of muscle contraction, including sliding filament theory, excitation–contraction coupling, neuromuscular		LGIS/ SGD	MCQs / VIVA

	junction, end-plate potential, and muscle fatigue.			
CF2-P-010	Describe the types of smooth muscle and explain their functional properties, including the latch phenomenon.	Smooth Muscles	LGIS/ SGD	MCQs / VIVA

Biochemistry				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
CF2-B-001	Describe the structure, types, biosynthesis, and functions of collagen and elastin, and explain their roles in maintaining the mechanical strength and elasticity of muscle connective tissue.	Biochemistry and Structural Basis of Muscle Function and Integrity	LGIS/ SGD	MCQs / VIVA
	Identify disorders associated with collagen and elastin defects, particularly those affecting muscle support structures and connective tissue integrity.		LGIS/ SGD	MCQs / VIVA
	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.		LGIS/ SGD	MCQs / VIVA
CF2-B-002	Explain the structure and basic function of the electron transport chain (ETC) and describe how oxidative phosphorylation generates ATP in muscle cells.	Energy Production in Muscles	LGIS/ SGD	MCQs / VIVA
	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.		LGIS/ SGD	MCQs / VIVA
	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		LGIS/ SGD	MCQs / VIVA

	muscle adaptation.			
	Describe the ATP–phosphocreatine (ATP-PC) system and its role in providing immediate energy during short-term, high-intensity muscle activity.		LGIS/ SGD	MCQs / VIVA
	Differentiate muscle fiber types (Type I, Ila, llb) based on structure, metabolism, and functional properties.		LGIS/ SGD	MCQs / VIVA
CF2-B-003	Describe vitamin C and its active forms, sources, RDA, biochemical roles, and deficiency manifestations.	Vitamins	LGIS/ SGD	MCQs / VIVA

Oral Biology & Tooth Morphology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
CF2-OB-001	Describe the chemical composition of bone.	Bone	LGIS/ SGD	MCQs / VIVA
	Describe the functions of osteoblasts, osteocytes, and osteoclasts in Bone Formation and Remodeling		LGIS/ SGD	MCQs / VIVA
	Describe the process of intramembranous and endochondral ossification		LGIS/ SGD	MCQs / VIVA
	Describe the microscopic Structure of Bone: (Osteon, central canal, lamellae, lacunae, canaliculi, and blood vessels).		LGIS/ SGD	MCQs / VIVA
	Explain of regulation of bone cell formation		LGIS/ SGD	MCQs / VIVA

Microbiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
CF2-Pa-001	Define microbial teratogens, Define TORCH infections and identify the impact of maternal infections (TORCH complex) on embryonic development and their dental implications.	Microbial Teratogens	LGIS/ SGD	MCQs / VIVA
CF2-Pa-002	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Staphylococci.	Staphylococci	LGIS/ SGD	MCQs / VIVA
CF2-Pa-003	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Mucormycosis	Mucormycosis	LGIS/ SGD	MCQs / VIVA
CF2-Pa-004	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Streptococci	Streptococci	LGIS/ SGD	MCQs / VIVA
CF2-Pa-005	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Actinomyces	Actinomyces	LGIS/ SGD	MCQs / VIVA
CF2-Pa-006	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Corynebacterium diphtheriae	Corynebacterium diphtheriae	LGIS/ SGD	MCQs / VIVA
CF2-Pa-007	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Porphyromonas	Porphyromonas	LGIS/ SGD	CQs / VIVA
CF2-Pa-	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory	Fusobacterium	LGIS/ SGD	MCQs / VIVA

008	diagnosis, and prevention of Fusobacterium			
CF2-Pa-009	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Candida	Candida	LGIS/ SGD	MCQs / VIVA

PRACTICALS / LAB WORK

Gross Anatomy				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
	Demonstrate and systematically identify major arteries, veins, and nerves		Demonstration	OSPE
CF2-A-009	On anatomical models or cadaveric dissections; locate their course, branches, and anatomical relations; and correlate their clinical	Surface Anatomy	Demonstration	OSPE
	significance with surrounding structures		Demonstration	OSPE
CF2-A-010	Identify and demonstrate the origin, insertion, nerve supply, and actions of the muscles of facial expression on models or cadaveric specimens	Jaw Muscles	Demonstration	OSPE
	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.		Demonstration	OSPE
CF2-A-011		Neurovascular Supply of face	Demonstration	OSPE

Oral Biology & Tooth Morphology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
CF2-OB-002	Draw and label osteoblasts, osteocytes, and osteoclasts and correlate each with its function.	Bone	Demonstration	OSPE
CF2-OB-003	Draw and label the stages / histological features of intramembranous and endochondral ossification.	Ossification	Demonstration	OSPE

MODULE NO. 6
NEUROSCIENCES - I

MODULE RATIONALE

The Neurosciences module introduces students to the structural and functional organization of the nervous system and its direct relevance to dental practice. Understanding neural control of sensory, motor, and autonomic functions is critical for interpreting pain pathways, reflexes, and neuromuscular coordination in the head and neck region. This module integrates anatomy, physiology, biochemistry, pharmacology, pathology, and microbiology to provide a comprehensive understanding of neuronal signaling, neurotransmission, autonomic regulation, and common neurological disorders. Students also explore clinical conditions such as trigeminal neuralgia, facial nerve palsy, meningitis, and neuropathies to strengthen their ability to correlate theoretical knowledge with clinical application. The learning experience combines lectures, models, cadaveric demonstrations, and practical sessions to develop a foundation for neurological understanding essential in anesthesia, pain management, and oral surgery.

Module Outcomes

- Describe the gross and microscopic organization of the central and peripheral nervous systems, including neurons, neuroglia, receptors, and effectors.
- Explain the structural and functional components of spinal cord, brainstem, cerebellum, cerebrum, and cranial nerves.
- Identify the major ascending and descending tracts and correlate their lesions with clinical signs and symptoms.
- Differentiate upper and lower motor neuron lesions based on anatomical and physiological principles.
- Discuss the formation, circulation, and absorption of cerebrospinal fluid (CSF) and its role in maintaining intracranial homeostasis.
- Explain the physiological basis of synaptic transmission, neural conduction, sensory processing, and reflex mechanisms.
- Interpret somatosensory and pain pathways with emphasis on trigeminal sensory systems and dental pain physiology.
- Relate motor control to the organization and function of the motor cortex, cerebellum, and basal ganglia.
- Describe the biochemical basis of neurotransmitter synthesis, release, and

inactivation, and relate disorders such as Parkinson's disease and Alzheimer's to molecular mechanisms.

- Explain the pharmacodynamics of drugs acting on the autonomic nervous system, including neurotransmitter regulation and receptor types.
- Discuss major neuropathologies such as meningitis, multiple sclerosis, and demyelinating diseases, along with their microbiological and pathological aspects.
- Perform basic cranial nerve examinations and demonstrate clinical localization of neurological function relevant to dentistry.

Subjects Integrated in the Module

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

THEORY

Anatomy				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
NS-A-001	Enlist various parts of nervous system, identify location of each part of nervous system. Recognize functions of each part of nervous system	Nervous System Overview	LGIS/ SGD	MCQs / VIVA
NS-A-002	Define neuron and discuss its structure	Neuron	LGIS/ SGD	MCQs / VIVA
NS-A-003	Classify neurons morphologically and functionally with examples	Neuron Classification	LGIS/ SGD	MCQs / VIVA
NS-A-004	Discuss components of central and peripheral nervous system	CNS & PNS Overview	LGIS/ SGD	MCQs / VIVA
NS-A-005	Give the supporting cells in central and peripheral nervous system	Neuroglia	LGIS/ SGD	MCQs / VIVA
NS-A-006	Define & classify receptors and effectors	Receptors and Effectors	LGIS/ SGD	MCQs / VIVA
NS-A-007	Highlight major subdivisions of ANS into sympathetic and parasympathetic nervous system with comparison of anatomical differences.	Sympatheticvs. Parasympathetic System	LGIS/ SGD	MCQs / VIVA
NS-A-008	Enlist all cranial nerves and their distribution.	Cranial Nerves	LGIS/ SGD	MCQs / VIVA
NS-A-009	Give the classification, structure, and functions of peripheral nerve fibers in a typical spinal	Spinal Nerve	LGIS/ SGD	MCQs /

	nerve.	Anatomy		VIVA
NS-A-010	Define dermatome	Dermatome	LGIS/ SGD	MCQs / VIVA
NS-A-011	Enlist the parts of the brain. Enumerate their major functions.	Brain Regions & its functions	LGIS/ SGD	MCQs / VIVA
NS-A-012	Identify the location, extent, coverings, and blood supply of spinal cord	Spinal Cord Overview	LGIS/ SGD	MCQs / VIVA
NS-A-013	Tabulate nuclear organization at different levels of spinal cord	Spinal Cord Nuclei	LGIS/ SGD	MCQs / VIVA
NS-A-014	Draw & label the transverse section of spinal cord at mid cervical level showing ascending & descending tracts	Spinal Cord Cross-Section	LGIS/ SGD	MCQs / VIVA
NS-A-015	Define gray & white matter and differentiate between the Fasciculus tract & Lemniscus tract	Spinal Cord Gray & White Matter	LGIS/ SGD	MCQs / VIVA
NS-A-016	Give the external feature of brain stem	Mid brain, Pons, Medulla & its blood supply	LGIS/ SGD	MCQs / VIVA
NS-A-017	Draw & Label cross-sections of the brainstem at the levels of the midbrain, pons, and medulla	Brainstem Cross Sectional Anatomy	LGIS/ SGD	MCQs / VIVA
NS-A-018	Discuss the location of cranial nerve nuclei, their functional components, and distribution, and its exit from respective skull foramina.	Cranial Nerve Nuclei and Pathways	LGIS/ SGD	MCQs / VIVA
NS-A-019	Identify the lobes of cerebellum	Cerebellar Lobes	LGIS/ SGD	MCQs / VIVA

NS-A-020	Define important clinical correlates, vermis syndrome, ataxia, dysarthria, dysdiadochokinesia, nystagmus, and vertigo.	Cerebellar Clinical Correlates	LGIS/ SGD	MCQs / VIVA
NS-A-021	Discuss internal structure of cerebral hemisphere (white matter, basal ganglia, lateral ventricle)	Cerebral Hemisphere Structure	LGIS/ SGD	MCQs / VIVA
NS-A-022	Briefly explain ventricular system (Lateral, 3rd & 4th ventricles)	Ventricular System	LGIS/ SGD	MCQs / VIVA
NS-A-023	Briefly explain various parts of internal capsule	Internal Capsule	LGIS/ SGD	MCQs / VIVA
NS-A-024	Draw and label the formation of Circle of Willis	Circle of Willis	LGIS/ SGD	MCQs / VIVA
NS-A-025	Explain meninges of the brain	Meninges	LGIS/ SGD	MCQs / VIVA
NS-A-026	Give the location, origin and termination of dural venous sinuses.	Dural Venous Sinuses	LGIS/ SGD	MCQs / VIVA
NS-A-027	Discuss the important structures associated with the cavernous sinus and its clinical significance in relation to the danger area of the face	Cavernous Sinus	LGIS/ SGD	MCQs / VIVA
NS-A-028	Discuss the anatomical basis of extradural, subdural and subarachnoid hemorrhages	Intracranial Hemorrhages	LGIS/ SGD	MCQs / VIVA
NS-A-029	Explain the formation, circulation and absorption of CSF (Cerebrospinal fluid)	CSF Physiology	LGIS/ SGD	MCQs / VIVA
NS-A-030	Discuss the origin, course, branches and distribution of internal carotid and vertebral artery	Brain Blood Supply	LGIS/ SGD	MCQs /

				VIVA
NS-A-031	Enlist the nuclei of thalamus and hypothalamus along with its functions & connections	Thalamus & Hypothalamus Connections	LGIS/ SGD	MCQs / VIVA

Physiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
NS-P-001	Classify synapse and explain the physiological anatomy of chemical synapse.	Organization of the Nervous System, Basic Functions of Synapses, and Neurotransmittes	LGIS/ SGD	MCQs / VIVA
	Elaborate the role of synapse in processing information.		LGIS/ SGD	MCQs / VIVA
	Classify the substances that act as neurotransmitters or synaptic transmitters. Enlist functions related to dentistry of each group.		LGIS/ SGD	MCQs / VIVA
	Define Excitatory and inhibitory postsynaptic potential and explain their mechanism of generation.		LGIS/ SGD	MCQs / VIVA
	Explain spatial and temporal summation.		LGIS/ SGD	MCQs / VIVA
	Explain the mechanism of synaptic fatigue its significance) and synaptic delay.		LGIS/ SGD	MCQs / VIVA
	Discuss the effects of hypoxia, acidosis and alkalosis on synaptic transmission		LGIS/ SGD	MCQs / VIVA
NS-P-	Define and classify the sensory receptors in the body on the basis of	Sensory Receptors,	LGIS/	MCQs /

002	stimuli they detect.	Neuronal Circuits for Processing Information	SGD	VIVA
NS-P-003	Discuss tonic and phasic receptors with 2 to 3 examples of each.		LGIS/ SGD	MCQs / VIVA
NS-P-004	Classify the nerve fibers on the basis of diameter and speed of conduction	Receptors Transduction of sensory stimuli into nerve impulses	LGIS/ SGD	MCQs / VIVA
NS-P-005	Classify somatic sensations.	Somatosensory cortex	LGIS/ SGD	MCQs / VIVA
	Explain two main ascending pathways (DCML and Anterolateral system) for transmitting sensation to CNS.		LGIS/ SGD	MCQs / VIVA
	Enlist sensations carried by dorsal column medial Lemniscal system and Anterolateral Pathway with special reference to Trigeminal sensory system.		LGIS/ SGD	MCQs / VIVA
	Trace these pathways from receptors to sensory cortex and compare their features.		LGIS/ SGD	MCQs / VIVA
	Give location and functions of Primary somesthetic area and sensory association area of sensory cortex. Name the sensations perceived by these areas.		LGIS/ SGD	MCQs / VIVA
	Describe the sensations lost when there is damage to somesthetic areas.		LGIS/ SGD	MCQs / VIVA
	Discuss representation of body parts		LGIS/	MCQs /

	in sensory cortex		SGD	VIVA
NS-P-006	Tabulate the sensory nerve endings, and anatomical sites of first, second, third order neurons of ascending tracts.	Ascending Tracts	LGIS/ SGD	MCQs / VIVA
NS-P-007	Trace the descending tracts.	Descending Tracts	LGIS/ SGD	MCQs / VIVA
NS-P-008	Differentiate clearly between upper and lower motor neuron lesions	UMN vs. LMN Lesions	LGIS/ SGD	MCQs / VIVA
NS-P-009	Identify the lobes, sulci & gyri	Cerebral Cortex Anatomy	LGIS/ SGD	MCQs / VIVA
NS-P-010	Describe functional areas of cerebrum	Functional Cortex	LGIS/ SGD	MCQs / VIVA
NS-P-011	Define and give physiological basis of referred pain with two examples.	Referred Pain & Trigeminal Neuralgia	LGIS/ SGD	MCQs / VIVA
	Define Trigeminal Neuralgia.		LGIS/ SGD	MCQs / VIVA
NS-P-012	Name the motor areas of cerebral cortex and give representation of body parts.	Cortical and Brain Stem Control of Motor Function	LGIS/ SGD	MCQs / VIVA
	Discuss the functions of motor areas		LGIS/ SGD	MCQs / VIVA
	Enlist the functions of brain stem		LGIS/ SGD	MCQs / VIVA
	Name the descending motor tracts. Describe the functions of corticospinal tract.		LGIS/ SGD	MCQs / VIVA

NS-P-013	Give Functional organization of spinal cord.	Spinal Cord Motor Functions and Reflexes	LGIS/ SGD	MCQs / VIVA
	Define reflex action and identify the components of a reflex arc.		LGIS/ SGD	MCQs / VIVA
	Define, classify and enlist components of stretch reflex with special reference to jaw reflex).		LGIS/ SGD	MCQs / VIVA
NS-P-014	Define and give types of cerebrovascular accident along with their salient features.	Effect of Lesions in the Motor Cortex or in the Corticospinal Pathway	LGIS/ SGD	MCQs / VIVA
NS-P-015	Enlist the components of limbic system and its general functions.	The Limbic System and the Hypothalamus	LGIS/ SGD	MCQs / VIVA
	Enlist functions of different portions hypothalamus.		LGIS/ SGD	MCQs / VIVA
	Explain the physiological basis and features of Alzheimer's disease		LGIS/ SGD	MCQs / VIVA
NS-P-016	Define memory.	Memory	LGIS/ SGD	MCQs / VIVA
	Classify memory on the basis of duration and information stored.		LGIS/ SGD	MCQs / VIVA
NS-P-017	Define retrograde and anterograde amnesia	The Autonomic Nervous System and the Adrenal Medulla	LGIS/ SGD	MCQs / VIVA
	Explain the effects of sympathetic and parasympathetic on various organs/ system of body		LGIS/ SGD	MCQs / VIVA
	Enlist types of autonomic receptors present in heart, blood vessels, smooth muscles, GIT, & EYE.		LGIS/ SGD	MCQs / VIVA
	Give features of Alarm or stress		LGIS/	MCQs /

	response		SGD	VIVA
NS-P-018	Enlist the functions of CSF	Cerebral circulation	LGIS/ SGD	MCQs / VIVA
NS-P-019	Give functional divisions of cerebellum along with their functions.	Cerebellum and Basal Ganglia Contributions to Overall Motor Control	LGIS/ SGD	MCQs / VIVA
	Enlist cerebellar nuclei		LGIS/ SGD	MCQs / VIVA
	Enlist features of cerebellar dysfunction		LGIS/ SGD	MCQs / VIVA
NS-P-020	Enlist components of basal ganglia in relation to other structures of the brain	Contributions to Overall Motor Control	LGIS/ SGD	MCQs / VIVA
	Discuss functions of basal ganglia		LGIS/ SGD	MCQs / VIVA
	Discuss pathophysiology and features of Parkinson's disease.		LGIS/ SGD	MCQs / VIVA
NS-P-021	Enlist the primary taste sensations.	The Chemical Senses—Taste and Smell	LGIS/ SGD	MCQs / VIVA
	Trace the taste pathway		LGIS/ SGD	MCQs / VIVA
	Enlist the primary sensations of smell		LGIS/ SGD	MCQs / VIVA
	Describe the physiological anatomy and location of olfactory membrane and olfactory receptors		LGIS/ SGD	MCQs / VIVA

Biochemistry				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
NS-B-001	Elaborate the structure of mannitol & give its clinical uses.	Osmotic diuretic	LGIS/ SGD	MCQs / VIVA
NS-B-002	Discuss neuropathies associated with deficiency/ toxicity of B1, B6 & B12.	Neuropathies	LGIS/ SGD	MCQs / VIVA
NS-B-003	Explain the biosynthesis, mechanism of action, and physiological role of acetylcholine, and discuss the clinical consequences of its deficiency	Neurotransmitters	LGIS/ SGD	MCQs / VIVA
	Outline the reactions involved in biosynthesis of catecholamines.		LGIS/ SGD	MCQs / VIVA
	Elaborate the mechanism of action of catecholamines.		LGIS/ SGD	MCQs / VIVA
NS-B-004	Briefly describe the cause, clinical features & management of Phenylketonuria.	Inherited disorders of amino acid metabolism	LGIS/ SGD	MCQs / VIVA
	Outline the metabolism of branched chain amino acids (BCAA).		LGIS/ SGD	MCQs / VIVA
	Briefly describe the cause, clinical features & management of maple syrup urine disease (MSUD).		LGIS/ SGD	MCQs / VIVA
NS-B-005	Briefly describe the consequences of protein misfolding (Alzheimer's disease and prion diseases).	Protein misfolding	LGIS/ SGD	MCQs / VIVA

Pharmacology & Therapeutics				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
NS-Ph-001	Describe the synthesis, storage, release and degradation of acetylcholine and norepinephrine of the ANS	Introduction to ANS	LGIS/ SGD	MCQs / VIVA
	Classify types of autonomic receptor (adrenergic and cholinergic) along with their location, actions and post receptor mechanism		LGIS/ SGD	MCQs / VIVA
NS-Ph-002	Classify and name the prototype drugs acting on the autonomic nervous system according to their site and mechanism of action.	Classification	LGIS/ SGD	MCQs / VIVA

General Pathology & Microbiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
NS-Pa-001	Define meningitis.	Infections of CNS	LGIS/ SGD	MCQs / VIVA
	Identify different types of meningitis according to etiology.		LGIS/ SGD	MCQs / VIVA
	Differentiate between the CSF findings of different types of meningitis		LGIS/ SGD	MCQs / VIVA
	Define encephalitis. Describe its etiology and pathogenesis		LGIS/ SGD	MCQs / VIVA
	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Streptococcus pneumoniae		LGIS/ SGD	MCQs / VIVA
	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Treponema pallidum		LGIS/ SGD	MCQs / VIVA
	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of herpes simplex virus		LGIS/ SGD	MCQs / VIVA
	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of varicella zoster virus		LGIS/ SGD	MCQs / VIVA
	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory diagnosis, and prevention of Clostridium tetani and Clostridium botulinum		LGIS/ SGD	MCQs / VIVA
	Describe the epidemiology, transmission, virulence factors, pathogenesis, laboratory		LGIS/ SGD	MCQs / VIVA

	diagnosis, and prevention of Spirochetes			
NS-Pa-002	Define concussion and contusion. Enlist their clinical features	Trauma to CNS	LGIS/ SGD	MCQs / VIVA
NS-Pa-003	Enumerate various demyelinating diseases of CNS Enlist clinical features and diagnosis of Multiple Sclerosis & Guillain-Barre syndrome	Demyelinating diseases of CNS	LGIS/ SGD	MCQs / VIVA

PRACTICALS / LAB WORK

Neuroanatomy				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
NS-A-036	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	Nervous system	Demonstration	OSPE

Physiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
NS-P-022	Examination of trigeminal nerve.	CN V	Demonstration	OSPE
NS-P-023	Examination of facial nerve.	CN VII	Demonstration	OSPE
NS-P-024	Examination of 9^{th}, 10^{th}, 11^{th} & 12^{th} nerve.	CN IX, X, XI, XII	Demonstration	OSPE
NS-P-025	Demonstrate Plantar reflex.	Motor System	Demonstration	OSPE
NS-P-026	Demonstrate deep tendon reflex.		Demonstration	OSPE

MODULE NO. 7
ALVEOLO-CEMENTAL COMPLEX-I

MODULE RATIONALE

The Alveolo-Cemental Complex module provides students with an integrated understanding of the structures that anchor and support teeth within the jaws. It explores the anatomy, histology, physiology, and pathology of the periodontium—including cementum, periodontal ligament, alveolar bone, and gingiva—and their collective role in maintaining oral health and function. Students also learn about tooth eruption, movement, and shedding, emphasizing the developmental and adaptive processes that sustain the dentition throughout life. By linking biological foundations with clinical disciplines such as periodontology, radiology, and community dentistry, this module equips students to recognize the early signs of periodontal disease, interpret radiographic changes, and apply preventive and therapeutic principles in dental practice.

Module Outcomes

- Describe the structure, composition, and functions of the periodontium and its components—cementum, periodontal ligament, alveolar bone, and gingiva.
- Explain the development, maturation, and age-related changes of supporting dental tissues.
- Differentiate between cellular and acellular cementum and discuss their roles in tooth attachment and repair.
- Identify the organization and fiber groups of the periodontal ligament and relate their orientation to masticatory function and tooth movement.
- Describe the histology and functional characteristics of gingival tissues, including epithelial zones and dentogingival and mucogingival junctions.
- Explain the mechanisms and phases of tooth eruption, movement, and shedding, and recognize factors causing abnormalities.
- Discuss the vascular, neural, and biochemical components of the supporting structures and their relevance to dental practice.
- Describe the pathological basis of acute and chronic inflammation as it relates to periodontal disease, and identify key microorganisms involved.
- Recognize the microbial and biochemical factors contributing to plaque and calculus formation, and their roles in periodontal disease progression.
- Demonstrate mechanical plaque control techniques such as brushing and flossing, emphasizing prevention and maintenance of periodontal health.
- Interpret radiographic features of the normal periodontium and identify radiological signs of

periodontal disease.

- Apply periodontal and oral health indices (Plaque Index, Gingival Index, CPI, CPITN) to assess and

monitor oral health status in community settings.

SUBJECTS INTEGRATED IN THE MODULE
• Oral Biology & Tooth Morphology • General Pathology & Microbiology • Periodontology • Dental Radiology • Community & Preventive Dentistry

THEORY

Oral Biology & Tooth Morphology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
ALC-OB-001	Define the alveolo-cemental complex (periodontium) and explain its role in dental support.	Periodontium Overview	LGIS/ SGD	MCQs / VIVA
ALC-OB-002	Identify its components (cementum, PDL, alveolar bone, gingiva) and their diagrammatic arrangement around the tooth.	Components of Periodontium	LGIS/ SGD	MCQs / VIVA
ALC-OB-003	Define cementum and explain its biochemical properties Classify, explain and differentiate between different types of cementum and its properties	Cementum	LGIS/ SGD	MCQs / VIVA
ALC-OB-004	Describe the process of cementogeneis Explain molecular factors associated with cemenotogenesis	Cementogen esis	LGIS/ SGD	MCQs / VIVA
ALC-OB-005	Classify and explain the structure of different types of cementum and their properties.	Types of Cementum	LGIS/ SGD	MCQs / VIVA
ALC-OB-006	Explain age-related changes of cementum.	Age-related changes of cementum	LGIS/ SGD	MCQs / VIVA

ALC-OB-007	Describe cementoenamel junction (CEJ) and attachment of cementum onto dentin	CEJ	LGIS/ SGD	MCQs / VIVA
ALC-OB-008	Differentiate between the structure of cellular and acellular cementum.	Cellular vs Acellular Cementum	LGIS/ SGD	MCQs / VIVA
ALC-OB-009	Describe the structure and functions of alveolar bone.	Alveolar Bone Structure and Function	LGIS/ SGD	MCQs / VIVA
ALC-OB-010	Elaborate its changes with age and its clinical considerations.		LGIS/ SGD	MCQs / VIVA
ALC-OB-011	Outline the chronological stages of healing in an Extraction Socket, from the formation of the blood clot to the final replacement by lamellar bone.	Bone Repair and Remodeling in the Extraction Socket	LGIS/ SGD	MCQs / VIVA
ALC-OB-012	Discuss the development of Periodontal Ligament (PDL)	Development of PDL	LGIS/ SGD	MCQs / VIVA
ALC-OB-013	Enlist the structure and function of the periodontal ligament.	PDL Structure & Function	LGIS/ SGD	MCQs / VIVA
ALC-OB-014	Describe the cellular component of PDL	PDL cellular component	LGIS/ SGD	MCQs / VIVA
ALC-OB-015	Describe the principal fiber bundles of PDL.	PDL Fiber Bundles	LGIS/ SGD	MCQs / VIVA
ALC-OB-016	Describe the adaptation of the periodontal ligament to the functional demands.	Functional Adaptation of Periodontal Ligament	LGIS/ SGD	MCQs / VIVA
ALC-OB-017	Describe the blood supply and nerve supply of PDL	Blood and Nerve Supply of PDL	LGIS/ SGD	MCQs / VIVA

ALC-OB-018	Describe the mechanisms of PDL cell recruitment during tissue turnover and repair.	PDL remodeling and regeneration.	LGIS/ SGD	MCQs / VIVA
ALC-OB-019	Describe the histological aspects of gingiva.	Gingival Histology	LGIS/ SGD	MCQs / VIVA
ALC-OB-020	Enumerate gingival fibers & their functions.	Gingival Fibers	LGIS/ SGD	MCQs / VIVA
ALC-OB-021	Tabulate blood and nerve supply of gingiva.	Gingival Blood and Nerve Supply	LGIS/ SGD	MCQs / VIVA
ALC-OB-022	Describe the structural and functional characteristics of different areas of Gingival epithelium	Gingival Epithelium	LGIS/ SGD	MCQs / VIVA
ALC-OB-023	Describe gingival sulcus and explain the development and structure of dentogingival junction (DEJ)	Dentogingival Junction	LGIS/ SGD	MCQs / VIVA
ALC-OB-024	Explain the histological mechanisms of repair at the DEJ	Healing and Regeneration of the DEJ	LGIS/ SGD	MCQs / VIVA
ALC-OB-025	Explain the structure of mucogingival junction.	Mucogingival junction.	LGIS/ SGD	MCQs / VIVA
ALC-OB-026	Describe eruption and phases of tooth movement.	Tooth Eruption Phases Pre-eruptive Tooth Movement	LGIS/ SGD	MCQs / VIVA
	Elaborate pre-eruptive tooth movement.		LGIS/ SGD	MCQs / VIVA
ALC-OB-027	Discuss the mechanism and factors responsible for eruptive tooth movement.	Eruptive Tooth Movement Mechanisms	LGIS/ SGD	MCQs / VIVA

ALC-OB-028	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 Movemens	LGIS/ SGD	MCQs / VIVA
ALC-OB-029	Discuss histology and causes of tooth shedding.	Tooth Shedding	LGIS/ SGD	MCQs / VIVA

Pathology & Microbiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
ALC-Pa-001	Define acute inflammation and its pathological basis relevant to dental conditions.	Acute Inflammation in Dental Conditions	LGIS/ SGD	MCQs / VIVA
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	LGIS/ SGD	MCQs / VIVA
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	LGIS/ SGD	MCQs / VIVA
ALC-Pa-004	Explain vascular and cellular events in acute inflammation and its relation to dental conditions like pulpitis and periodontitis.	Vascular and Cellular Events in Acute Inflammation	LGIS/ SGD	MCQs / VIVA
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	LGIS/ SGD	MCQs / VIVA
ALC-Pa-006	Identify and explain the role of microbes causing acute inflammation in dental infections, such as Streptococcus mutans and Porphyromonas	Microbes Causing Dental Infections	LGIS/ SGD	MCQs / VIVA

	gingivalis.			
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	LGIS/ SGD	MCQs / VIVA
ALC-Pa-008	Define chronic inflammation and its significance in persistent oral and systemic conditions.	Chronic Inflammation and Its Oral/Systemic Significance	LGIS/ SGD	MCQs / VIVA
ALC-Pa-009	Identify chronic inflammatory cells, such as macrophages and lymphocytes, and mediators like TNF-a and IL-1.	Chronic Inflammatory Cells and Mediators	LGIS/ SGD	MCQs / VIVA
ALC-Pa-010	Discuss Porphyromonas and Fusobacterium with its pathogenesis.	Pathogenesis of Porphyromonas and Fusobacterium	LGIS/ SGD	MCQs / VIVA

Periodontology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
ALC-Pe-001	Define key terminologies related to periodontal diseases: Gingivitis, periodontitis, periodontal pockets, clinical attachment level and periodontal bone loss	Periodontal Disease Terminology	LGIS/ SGD	MCQs / VIVA
ALC-Pe-002	Define & Classify Periodontal Diseases	Periodontal Disease	LGIS/ SGD	MCQs / VIVA
ALC-Pe-003	Identify the microbial composition of healthy gingival and periodontal tissues.	Healthy Microbial Composition and Periodontal Homeostasis	LGIS/ SGD	MCQs / VIVA
ALC-Pe-004	Enlist key red complex bacterial species involved in periodontal disease (e.g., Porphyromonas gingivalis, Tannerella forsythia, Treponema denticola).	Pathogenic Bacterial Species in Periodontal Disease	LGIS/ SGD	MCQs / VIVA
ALC-Pe-005	What is Plaque biofilm and how is it formed and what is its role in periodontal diseases.	Plaque Biofilm Formation and Role in Disease	LGIS/ SGD	MCQs / VIVA
ALC-Pe-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.		LGIS/ SGD	MCQs / VIVA
ALC-Pe-	Explain the adherent nature of dental plaque and why it is not easily visualized. Describe the importance of	Plaque Visualization, Disclosure, and	LGIS/ SGD	MCQs / VIVA

007	plaque disclosure and justify the need for mechanical plaque removal by both the patient and oral health professionals.	Mechanical Removal		
ALC-Pe-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	LGIS/ SGD	MCQs / VIVA
ALC-Pe-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	LGIS/ SGD	MCQs / VIVA
ALC-Pe-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	LGIS/ SGD	MCQs / VIVA
ALC-Pe-011	Enlist methods of plaque removal techniques	Plaque removal techniques	LGIS/ SGD	MCQs / VIVA

Dental Radiology				
CODE	**SPECIFIC LEARNING OUTCOME**	**TOPIC**	**MIT**	**AT**

ALC-DR-001	Define the role of radiology in diagnosing and assessing periodontal diseases. Explain radiological features of healthy periodontium.	Role of Radiology in Periodontal Disease	LGIS/ SGD	MCQs / VIVA
ALC-DR-002	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	LGIS/ SGD	MCQs / VIVA

Community & Preventive Dentistry				
CODE	**SPECIFIC LEARNING OUTCOME**	**TOPIC**	**MIT**	**AT**
ALC-CD-001	Define and explain the key periodontal indices used in epidemiological studies (Gingival Index, Plaque Index, OHI-S, CPI, CPITN).	Periodontal Indices	LGIS/ SGD	MCQs / VIVA
ALC-CD-002	Differentiate between various periodontal conditions based on pathophysiology and clinical signs.	Periodontal Conditions	LGIS/ SGD	MCQs / VIVA
ALC-CD-003	Describe the stages and progression of gingivitis and periodontitis.	Disease Progression	LGIS/ SGD	MCQs / VIVA
ALC-CD-004	Explain the principles and methodology for measuring gingivitis and periodontitis; interpret findings using standard indices.	Measurement Methods in Periodontal Health	LGIS/ SGD	MCQs / VIVA
ALC-CD-005	Perform and interpret the Community Periodontal Index of Treatment Needs (CPITN) to assess periodontal status and identify treatment needs.	CPITN and Treatment Needs Assessment	LGIS/ SGD	MCQs / VIVA
ALC-CD-006	Conduct dietary history for caries risk assessment and demonstrate use of indices (Gingival Index, Plaque Index, CPI, CAL) in oral health surveys.	Oral Health Assessment and Risk Evaluation	LGIS/ SGD	MCQs / VIVA

PRACTICALS / LAB WORK

Pathology & Microbiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
ALC-Pa-011	Identify histological slides of acute, chronic & granulomatous inflammation.	Histological Identification	Demonstration	OSPE

Periodontology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
ALC-Pe-011	Demonstrate plaque removal techniques including proper brushing and flossing.	Brushing and Flossing Techniques	Demonstration	OSPE

Dental Radiology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
ALC-DR-003	Identify normal periodontal structures on radiographs (OPG and periapical).	Normal Periodontal Structures on Radiographs	Demonstration	OSPE
ALC-DR-004	Observe alveolar bone and assess bone levels.	Alveolar Bone Observation and Level Assessment	Demonstration	OSPE
ALC-DR-005	Identify the periodontal ligament (PDL) space on radiographs.	Periodontal Ligament Space Identification	Demonstration	OSPE

ALC-DR-006	Identify the lamina dura on radiographs.	Lamina Dura Identification	Demonstration	OSPE
ALC-DR-007	Recognize the cementoenamel junction (CEJ) on radiographs.	Cementoenamel Junction Recognition	Demonstration	OSPE
ALC-DR-008	Differentiate between cortical and cancellous bone on radiographs.	Cortical vs. Cancellous Bone Differentiation	Demonstration	OSPE

Oral Biology & Tooth Morphology				
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOPIC**	**MIT**	**AT**
ALC-OB-030	Draw and label the differentiation of cement oblasts from ectomesenchyme cells & the fragmentation of Hertwig's epithelial root sheath.	Cementoblast	Demonstration	OSPE
ALC-OB-031	Draw and label the types of cementoenamel junction	CEJ	Demonstration	OSPE
ALC-OB-032	Draw and label cellular cementum.	Cellular Cementum	Demonstration	OSPE
ALC-OB-033	Draw and label the alveolar and bundle bone	Alveolar & Bundle Bone	Demonstration	OSPE
ALC-OB-034	Draw and label the periodontal ligament in a cross-section between teeth	PDL cross-section	Demonstration	OSPE

ALC-OB-035	Draw and label the arrangement of principal fiber group within the periodontium.	Principal fibers group of PDL	Demonstration	OSPE
ALC-OB-036	Draw and label the gingival group of fibers (gingival ligament).	Gingival group of fibers	)emonstration	)SPE
ALC-OB-037	Draw and label different anatomical zones of gingiva; mucocutaneous junction, mucogingival junction, & dentogingival junction.	Gingiva & its Junctions	Demonstration	OSPE

PRISME	
P	Professionalism
R	Research
I	Informatics
S	Social Responsibility Social Accountability
M	Management (Healthcare)
E	Evidence Based Dentistry (EBD)

SOCIAL RESPONSIBILITY, CULTURAL SENSITIVITY, ETHICS & JURISPRUDENCE	
Year	**Learning Objectives**
I	• Define social responsibility in dentistry • Describe role of dentist in public health promotion • Identify cultural diversity in Pakistan • Explain principles of ethics (autonomy, beneficence, non-maleficence, justice) • Take a proper dental consent prior to treatment

	INFORMATICS
Year	**Learning Outcomes (LOs)**
I	• Practice email etiquette & online communication norms (WhatsApp/Social Media Platforms) • Use Word/Google Docs for academic writing basics • Apply safe internet use, recognize credible vs. unreliable sources

TEACHING METHODOLOGIES

Instructural 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 instruction** 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

Clinical Teaching
Teaching and learning that occurs with actual patient as the focus. It occurs in the dental simulation labs, Dental Clinics and for OMFS in the wards and operation theatre **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

ASSESSMENT

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/Clinical Clerkships sent to the Controller of Examinations through office of the Principal of the concerned college, at the end of each Block/Clinical Clerkships, as well as at the conclusion of the academic session along with the admission form for the professional examination.
   d. Has been certified by the principal of his/her college:
      (i) of good character;
      (ii) of having attended not less than cumulative 75%* of the full course of lectures delivered, practical and clinical rotations conducted in the particular academic session, while maintaining 75 % attendance in each Block/Clinical Clerkship,
      (iii) of having appeared at the Block/Clinical Clerkship Examinations conducted by the college of enrolment with at least 50 % marks* in each Block/Clinical Clerkship examination, as well as in aggregate score of all Blocks/Clinical Clerkships examinations for the concerned year;

2. Written/Theory paper in all Professional Examinations in Modular Integrated MBBS or BDS Curricula shall consist of MCQs alone, with effect from Annual 2026 Examinations. (Ref: No. UHS/REG-25/2379, dated 17.11.2025)
3. The minimum number of marks required to pass the professional examination for each Block/Clinical Clerkship shall be fifty percent (50%) in Written and fifty percent (50%) in the 'Oral/Practical/Clinical' examinations and fifty percent (50%) in aggregate, independently and concomitantly, at one and the same time.

4. A candidate failing in one or more Blocks/Clinical Clerkships in the annual examination shall be provisionally allowed to join the next professional class till the commencement of supplementary examinations. The candidate, however, shall have to pass the failed Block/s or Clinical Clerkship in this supplementary examination failing which he / she shall be detained in the professional year. Under no circumstances, a candidate shall be promoted to the next professional class till
   he/she has previously passed all the Blocks/Clinical Clerkships in the preceding professional
   examination.
   If a student appears in the Supplementary Examination for the first time as he/she did not appear in the annual examination for any reason and failed in any Block/Clinical Clerkship in the Supplementary Examination, he/she will be detained in the same class and will not be promoted to the next class.
   **Notification No.UHS/REG-25/2351 Dated 13-11-2025*

5. Only one annual and one supplementary of each Professional Examination shall be allowed in a particular academic session. However, 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 relevant authorities, i.e., Syndicate and Board of Governors.
6. Any student who fails to clear the First or Second Professional MBBS / First Professional BDS Examination, in four consecutive attempts, each, inclusive of both availed as well as un-availed attempts, after becoming eligible for the examination, and has been expelled on that account shall not be eligible for continuation of studies and shall not be eligible for admission as a fresh candidate in either MBBS or BDS.
7. The application for admission of each candidate to the professional examination shall be submitted to the Controller of Examination, through the Principal of the College, on the prescribed format, as per notified schedule, accompanied by the prescribed fee.
8. The candidates shall pay their fee through the principal of their respective

Colleges, who shall forward the Examination Forms along with the duly paid challan of the examination fee generated from the Online Examination Form.

9. The continuous internal assessment through the Block/Clinical Clerkship, conducted by the college of enrollment, shall carry 20% weightage in the total allocated marks for the concerned Block/Clinical Clerkship in the Professional Examination conducted by the university. The score will be equally distributed to the Written and "Oral/Practical/Clinical" Examinations.
10. The marks of internal assessment through Blocks/Clinical Clerkships examination and attendance record shall be submitted to Controller of Examinations, along with question papers and keys for the Block/Clinical Clerkship examination, within two weeks of completion of each Blocks/Clinical Clerkships examination.

    Further, parent-teacher meetings shall be arranged by the colleges after every Block/Clinical Clerkship examination to share feedback on the progress of students with their parents. Minutes of parent teacher meetings, academic timetables/schedule of Blocks/Clinical Clerkships and academic year study guides shall be submitted to the Department of Medical Education UHS, as well.
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 colleges may arrange remedial classes and one re-sit for each Block/Clinical Clerkship examination after fulfillment of prescribed requirements given below. 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:

Block/Clinical Clerkship Attendance	Remedial Classes

<75%, ≥ 50% (50-74%)	i. Principal of the college may conduct remedial classes and submit result to the Examination Department, UHS, independently. ii. Principal of the college may conduct remedial classes for detained students, who have short attendance in the first Block/Clinical Clerkship of a professional year after detention. The college may submit record of the remedial classes to the Examination Department, UHS, independently.
<50%	i. Principal of the college may submit attendance record of such students to Department of Medical Education, UHS, seeking permission for conduct of remedial Classes. The conduct of remedial classes in such cases shall be arranged only after permission from the Competent Authority in the university. ii. The colleges shall also have to provide the university with the reasons submitted by the candidates for short attendance along with documentary evidence for the same duly verified by the principal. iii. The following shall be considered as valid reasons for short iv. attendance of the students for consideration of permission for remedial classes: v. Illness/accident/surgery of the student or sickness/death of an immediate relative/being afflicted by a natural/man-made calamity or disaster or detained students (missed the first Block/Clinical Clerkship of the year), students clearing their preceding professional examination in supplementary, or late admitted students who have been permitted for joining by UHS

13. The following policy shall be applicable for transition of students From Traditional Subject-Based Scheme to the Modular Integrated Curriculum Scheme:

    i. The students who fail in all subjects of the professional examination, either by taking the examination or due to non-appearance, and are

detained in the respective professional year, shall follow the Modular Integrated Curriculum Scheme for their teaching and assessment.

ii. The students who fail in one or more subjects but not all the subjects of a professional examination, either by taking the examination or due to non-appearance, and are detained in the respective professional year, shall attend classes with students following the Modular Integrated Curriculum Scheme, but they will be examined in the failed subject/s according to their parent scheme, i.e., the Traditional Subject-Based Curriculum Scheme.

Block Exam Total = 300 Marks			
Theory Exam	120 Marks	Practical/Clinical Exam	120 Marks
Internal Assessment (10 %)	30 Marks	Internal Assessment (10 %)	30 Marks
Theory Exam + Internal Assessment	**150 Marks**	**Practical/Clinical Examination + Internal Assessment**	**150 Marks**

INTERNAL ASSESSMENT

It shall constitute 20% of the total assessment at the end of the academic year.

	Scoring Parameter	Weightage (percentage)
Theory 10 %	Attendance	75% attendance -1 % >85% attendance -2 %
	Block Exam (MCQs only)	5 %
	Continuous assessment (SEQs, MCQs etc)	3 %
Practical 10 %	Attendance	75% attendance -1 % >85% attendance -2 %
	Block Exam	5 %
	Portfolio-clinical logbooks (CFRC, PRISME)	3 %

BDS 1st Year, BLOCK-02							
Sr. No.	Written Exam		Oral/Practical exam				Total
	Subjects	No. of MCQs	Subjects	OSPE (9 marks)	OSCE/ CFRC (9 marks)	OSVE (6 marks)	
1	Anatomy	23	Anatomy	01	-	01	15
2	Oral Biology	20	Oral Biology	03	-	01	33
3	Biochemistry	19	Biochemistry	-	-	01	06
4	General Pathology & Microbiology	14	General Pathology & Microbiology	01	-	01	15
5	Physiology	18	Physiology	-	01	01	15
6	Oral Pathology	7	Oral Pathology/ Periodontology	01	-	01	15
7	Community Dentistry	4	Community Dentistry /Dental Radiology	01	-	01	15
8	Periodontology/ Dental Radiology	4	Pharmacology	-	-	01	06
9	Pharmacology	7	-	-	-	-	-
10	Dental Radiology	4	-	-	-	-	-
Total		120	Total	7 OSPE= 63 marks	1 OSCE/ CFRC = 09 marks	8 OSVE= 48 marks	120

Learning Resources

Subject	Learning Resources
General Anatomy, Histology & Embryology	1. General Anatomy by Laiq Hussain Siddiqui 7th Edition 2. Medical Histology Text and Atlas by Laiq Hussan Siddique 9th Edition 3. Langman's Medical Embryology 15th Edition 4. Snell's Clinical Anatomy by Regions 11th Edition 5. Snell's Clinical Neuroanatomy 9th Edition
Physiology	1. Guyton & Hall. Textbook of Medical Physiology (14th ed.). 2. Essential Physiology for Dental Students (Essentials (Dentistry)) 1st Edition by Kamran Ali (Editor), Elizabeth Prabhakar (Editor)
Biochemistry	1. Harper's Illustrated Biochemistry (32nd ed.) by Rodwell et al. 2. Lippincott Illustrated Reviews: Biochemistry (8th ed.) by Abali et al.
Oral Biology & Tooth Morphology	1. Nanci, A. (2024). Ten Cate's Oral Histology, Development, Structure, and Function (10th ed.). Elsevier Health Sciences. 2. Fuller, J. L. (4th ed.). Concise Dental Anatomy & Morphology. 3. Nelson, S. J. (2015). Wheeler's Dental Anatomy, Physiology and Occlusion (1st SAE) (for Occlusion).
Pathology & Microbiology	1. Robbins & Cotran Pathologic Basis of Disease 2. Review of Medical Microbiology and Immunology by Levinson
Community & Preventive Dentistry	1. Textbook of Public Health Dentistry by SS Hermith

Pharmacology & Therapeutics	1. Katzung & Trevor's Pharmacology Examination & Board Review (12th ed.)- Mini 2. Lippincott Illustrated Reviews: Pharmacology (7th ed.)
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 3. Summitt's Fundamentals of Operative Dentistry
Behavioral Sciences	1. Hand book of Behavioral sciences, by MH Rana, 3rd ed. 4. Humayun A., Herbert M. (2010). Integrating behavioural sciences in healthcare. Islamabad: HEC.
Periodontology	5. Newman and Carranza's Clinical Periodontology (3rd South Asia Edition)
Oral Medicine	6. Tyldesley's Oral Medicine (5th Edition)
Dental Radiology	7. K. Horner, K. A. Eaton's Selection Criteria for Dental Radiography (3rd Edition)