



UNIVERSITY MEDICAL
& DENTAL COLLEGE

STUDY GUIDE

BLOCK 4

THEORY

ORAL BIOLOGY & TOOTH MORPHOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
Car2-OB-001	Describe the general considerations and morphological features of maxillary premolars, including their labial, lingual, mesial, distal, and occlusal aspects, as well as root morphology.	Morphology of Premolars
	Describe the general considerations and morphological features of mandibular premolars, including their labial, lingual, mesial, distal, and occlusal aspects, as well as root morphology.	
	Differentiate maxillary from mandibular premolars using key identification criteria such as cusp morphology, root anatomy, and occlusal patterns.	
Car2-OB-002	Identify and explain variations and anomalies in crown and root morphology of premolars.	Anomalies of Premolars
Car2-OB-003	Explain and analyze the number, shape, and anatomical variations of pulp canals and pulp chambers in premolars, with reference to radiographic appearances.	Pulp Morphology & Radiographic correlation
Car2-OB-004	Describe the general considerations and detailed morphology of the labial, lingual, mesial, distal, occlusal aspects, and root structure of permanent maxillary molars.	Morphology of Permanent maxillary molars
Car2-OB-005	Describe the general considerations and detailed morphology of the labial, lingual, mesial, distal, occlusal aspects, and root structure of permanent Mandibular molars.	Morphology of permanent Mandibular molars.
Car2-OB-006	Enlist and compare key identification features of maxillary deciduous & permanent molars based on cusp pattern, crown outline, and root configuration.	Comparison of Deciduous & Permanent molars.

Car2-OB-007	Enlist and compare key identification features of deciduous & permanent mandibular molars based on cusp pattern, crown outline, and root configuration.	
Car2-OB-008	Enlist morphological anomalies in the crown and root of deciduous and permanent molars.	Molar Morphological Anomalies
Car2-OB-009	Explain and analyze the number, shape, and anatomical variations of pulp canals and pulp chambers in deciduous & permanent molars, with reference to radiographic appearances.	Pulp Morphology and Radiographic Correlation

OPERATIVE DENTISTRY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
Car2-OD-001	Discuss the etiology of dental caries.	Dental Caries
Car2-OD-002	Classify dental caries based on site, severity, and activity.	Classification of Dental Caries
Car2-OD-003	Describe the dynamic process of demineralization and remineralization in the development of caries.	Demineralization and remineralization
Car2-OD-004	Discuss the clinical characteristics of dental caries.	Clinical characteristics of dental caries
Car2-OD-005	Explain the radiographic appearance of dental caries.	Caries' Radiographic Appearance
Car2-OD-006	Discuss prevention of caries using medical model.	Caries Prevention
Car2-OD-007	Outline minimally invasive and operative approaches to caries management.	Caries Management
	Explain the criteria used to classify adult and pediatric patients into high, moderate, or low caries risk based on clinical findings, caries history, and relevant risk factors.	

Car2-OD-008

Describe principles of caries risk assessment and their role in clinical decision-making.

Caries risk
Assessment

ORAL PATHOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
Car2-OP-001	Define dental caries and outline its initiation in enamel.	Zones of Caries
	List and identify zones of enamel caries & histological images.	
	List the zones of dentin caries.	
	Outline the progression of caries from enamel to dentin.	
Car2-OP-002	Explain standardized systems (International Caries Detection and Assessment System (ICDAS) for the detection and clinical evaluation of carious lesions and pulp health status.	Caries Detection and Diagnosis
Car2-OP-003	Evaluate the etiology and contributing factors of non-cariou cervical and enamel lesions, including erosion, abrasion, attrition, abfraction and molar–incisor hypo mineralization (MIH).	Tooth Surface Loss and Enamel Defects
	Identify and differentiate enamel and dentin defects (hypoplasia, amelogenesis imperfecta, fluorosis, MIH, erosion, abrasion, attrition, and developmental malformations) based on clinical and radiographic criteria.	
	Differentiate developmental enamel defects from early carious lesions based on clinical and radiographic findings to prevent unnecessary intervention.	
Car2-OP-004	Define pulpitis and give its type.	Pulpitis
	Differentiate between reversible & irreversible pulpitis.	

ORAL MEDICINE / DENTAL RADIOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
Car2-DR-001	Explain the role of radiographic aids in diagnosing carious lesions and periodontal disease.	Interpretation of Conventional Radiographs

PRACTICALS / LAB WORK

ORAL BIOLOGY & TOOTH MORPHOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
Car2-OB-010	Identify and draw the outlines of all premolars (labial, lingual, mesial, distal, and occlusal aspects) on paper or models, labeling morphological features such as cusps, ridges, fossa, contact points, roots, and pulp canals Accurately label all key morphological features (e.g., cusps, marginal ridges, transverse ridges, triangular ridges, developmental depressions, pits, and grooves) on premolar models	Premolars
	Carve anatomical models of premolars using soap blocks/ wax blocks	
Car2-OB-011	Identify and draw the outlines of all permanent molars (labial, lingual, mesial, distal, and occlusal aspects) on paper or models, labeling their key features, including oblique ridges and root anatomy Identify and draw the outlines of deciduous molars.	Molars
	Accurately label all key morphological features (Cusps name, cusp ridges, marginal ridges, transverse ridges, triangular ridges, fossa, developmental depressions, contact points, name of roots/pulp canals, etc.) on molar models	
	Carve anatomical models of molars using soap blocks/ wax blocks	

OPERATIVE DENTISTRY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
Car2-OD-009	Identify clinical characteristics of dental caries in a clinical setup.	

Car2-OD-010	Identify various classes of carious lesions using images.	Dental Caries
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THEORY

COMMUNITY & PREVENTIVE DENTISTRY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
CDPH1-CD-001	Describe the principles and scope of Dental Public Health and its role in promoting community oral health.	Introduction to Dental Public Health
CDPH1-CD-002	Explain how individual dental care contributes to population-level oral health outcomes.	Concept of Oral Health and Disease
CDPH1-CD-003	Explain the criteria used to identify oral conditions that constitute public health problems.	Oral Conditions as Public Health Problems
CDPH1-CD-004	Compare professional and layperson perspectives of health, disease, and illness.	Concepts of Health and Illness
CDPH1-CD-005	Explain the iceberg phenomenon and its relevance to subclinical oral diseases.	Epidemiological Concepts
CDPH1-CD-006	Explain the common risk factor approach and apply it to preventive oral health planning.	Risk Factors and Prevention Strategies
CDPH1-CD-007	Describe the major patterns and social determinants contributing to oral health inequalities.	Social Determinants of Health
CDPH1-CD-008	Analyze socioeconomic, behavioral, and environmental causes of oral health inequalities.	Health Inequalities
CDPH1-CD-009	Differentiate between high-risk, population, and common risk factor prevention strategies.	Prevention Approaches in Oral Health
CDPH1-CD-010	Evaluate the suitability of preventive strategies for different oral health contexts.	Planning Preventive Programs
CDPH1-CD-011	Explain the principles and applications of screening in oral health programs.	Screening in Dental Public Health

CDPH1-CD-012	Explain Wilson and Jungner criteria and evaluate their application in screening programs for oral diseases.	Screening Evaluation
CDPH1-CD-013	List and explain the desirable properties of an ideal screening test.	Screening Tests

ORAL MEDICINE / DENTAL RADIOLOGY		
CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
Car2-DR-002	Determine the radiographic severity of carious lesions on radiographic images.	Radiographic Caries Interpretation
Car2-DR-003	Assess and interpret radiographs to determine the depth and severity of carious lesions.	

CDPH 1-CD-014	Differentiate between screening and diagnostic tests based on purpose and methodology.	Screening vs Diagnosis
CDPH 1-CD-015	Define epidemiology and explain its role in understanding oral disease distribution.	Introduction to Epidemiology
CDPH 1-CD-016	Explain the applications of epidemiology in planning and evaluating dental services.	Epidemiology and Oral Health Services
CDPH 1-CD-017	Classify epidemiological studies and describe their design and use in oral health research.	Epidemiological Study Designs
CDPH 1-CD-018	Explain the fundamental framework of an epidemiological study applicable to dental public health	Study Planning and Design

CDPH 1-CD- 019	Analyze how epidemiological findings guide preventive and clinical dental practices.	Application of Epidemiology
CDPH 1-CD- 020	Define bias and confounding and explain their influence on study validity.	Research Validity
CDPH 1-CD- 021	Explain techniques such as randomization and blinding and their role in minimizing bias in research studies.	Research Methodology
CDPH 1-CD- 022	Compare epidemiological, screening, and clinical approaches to oral disease management.	Integrated Disease Control Approaches
CDPH 1-CD- 023	Explain how epidemiological and screening principles can be applied in clinical and community dental care.	Application to Practice
CDPH 1-CD- 024	Differentiate and calculate prevalence and incidence rates to interpret oral health trends.	Epidemiologic al Measurements
CDPH 1-CD- 025	Classify and describe different types of oral health surveys.	Oral Health Surveys
	Explain the standardized steps involved in designing and conducting a simple oral health survey	
CDPH 1-CD- 026	Describe data types, variables, statistical methods, sampling techniques, and present findings graphically.	Data Handling and Presentation
CDPH 1-CD- 027	Define range, variance, mean deviation, and standard deviation as measures of data	Research dynamics
CDPH 1-CD- 028	Define probability and explain its application in dental research and data interpretation.	

CDPH1-CD-029	Interpret and calculate key descriptive measures of data, including central tendency and dispersion.	Hypothesis testing in research & Presentation of data
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CDPH1-CD-030	Correlate standard deviation with mean and the concept of normal distribution	Parametric and non-parametric tests
CDPH1-CD-031	Define and explain Normal distribution (Bell curve) and its characteristics. explain the importance of normal distribution in research as well as on choice of tests of significance	
	Differentiate between parametric and non-parametric tests and select appropriate tests of significance (t-test, Chi-square test, and their alternatives) based on data type and distribution.	
CDPH1-CD-032	Differentiate skewness and kurtosis types.	
CDPH1-CD-033	Explain the cause-and-effect relationships underlying major oral diseases.	Disease Causation
CDPH1-CD-034	Define and classify oral health indices used in epidemiological studies.	Oral Health Indices
CDPH1-CD-035	describe prevalence, distribution, and risk factors of periodontal diseases.	Periodontal Epidemiology
CDPH1-CD-036	Identify etiological factors and explain the triad of host, agent, and environment in periodontal disease.	Etiological Triads
CDPH1-CD-037	Evaluate preventive strategies for reducing the incidence of periodontal disease.	Periodontal Disease Prevention
CDPH1-CD-038	Explain the key components and strategies for planning oral health promotion programs aimed at preventing periodontal disease.	Health Promotion
CDPH1-CD-039	Explain etiological triads and contributing risk factors for oral cancer.	Oral Cancer Etiology
CDPH1-CD-040	Identify and implement preventive strategies for oral cancer in clinical settings.	Oral Cancer Prevention

CDPH1-CD-041	Design community-based oral cancer prevention programs using public health approaches.	Community Prevention Programs
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BEHAVIORAL SCIENCES		
CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
CDPH1-BhS-001	Explain and apply the biopsychosocial model in dental patient care.	Biopsychosocial Model
CDPH1-BhS-002	Describe psychological development stages (Piaget, Erikson, Freud) and their relevance to patient behaviour in dental settings.	Human Development
CDPH1-BhS-003	Explain how personality traits influence patient reactions to oral health challenges and stress in a dental setting.	Personality
CDPH1-BhS-004	Describe patient stress responses and explain how coping mechanisms influence behaviour and cooperation in dental settings.	Patient Stress & Coping
CDPH1-BhS-005	Identify illness behaviour patterns in dental patients and apply appropriate management strategies.	Illness Behaviour
CDPH1-BhS-006	Define dental anxiety and phobia and explain their impact on patient attendance, treatment compliance, and oral health outcomes.	Dental Anxiety -- Foundation
CDPH1-BhS-007	Describe the stages of grief and identify psychological responses to dental-related loss.	Grief -- Stages Grief -- Communication
	Apply supportive communication strategies for patients experiencing grief or dental-related emotional distress.	
CDPH1-BhS-008	Recognize signs of domestic violence, abuse, and self-harm presenting in the dental setting.	Safeguarding - - Recognition Safeguarding - - Responsibilities
	Outline legal responsibilities and appropriate intervention pathways when domestic violence or self-harm is suspected.	

CDPH1-BhS-009	Explain evidence-based methods of patient reassurance and emotional support and describe their impact on treatment outcomes.	Reassurance & Emotional Support
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PRACTICALS / LAB WORK		
COMMUNITY & PREVENTIVE DENTISTRY		
CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
CDPH1-CD-042	Practise DMFT, CPI scoring on typodonts/models/case scenarios	Indices Recording (DMFT, CPI)
	Learning how to record indices and simple epidemiological measures	
CDPH1-CD-043	Calculate mean, range, variance, and standard deviation using small datasets provided.	Basic Biostatistics
CDPH1-CD-044	Interpret sample histograms and differentiate normal, skewed, and kurtotic distributions.	Skewness & Kurtosis
CDPH1-CD-045	Perform basic dental screening by applying the principles of screening, using the Wilson and Jungner criteria and features of ideal screening tests.	Dental Screening
	Distinguish screening findings from diagnostic assessments.	
CDPH1-CD-046	Conduct a community-based oral health assessment by performing dental history taking, clinical examination, and DMFT index recording using WHO Oral Health Assessment Form.	Community Visit 1: Dental Caries Assessment Activity
BEHAVIORAL SCIENCES		
CODE	SPECIFIC LEARNING OUTCOMES	TOPIC

CDPH1-BhS-010	Demonstrate communication with paediatric, adolescent, and adult patients based on developmental stage.	Age-Specific Communication
CDPH1-BhS-011	Perform behaviour management using Tell-Show-Do with a simulated anxious paediatric patient.	Tell-Show-Do Technique
CDPH1-BhS-012	Demonstrate empathetic, patient-centred communication, apply empathy skills effectively, and provide structured psychological support to distressed patient. Explain a dental procedure to a patient with low health literacy using simple language.	Empathetic & Supportive Communication

CDPH1-BhS-013	Apply shared decision-making in a simulated treatment planning discussion.	Shared decision making
CDPH1-BhS-014	Resolve interpersonal conflicts in a dental practice setting ensuring patient safety and team harmony.	Conflict Resolution
CDPH1-BhS-015	Demonstrate structured emotional support and empathetic communication with a simulated patient experiencing dental-related grief or distress.	Grief Support - Applied

THEORY

SCIENCE OF DENTAL MATERIALS

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
DMPD1-DM-001	Define and differentiate the key physical properties of dental materials including density, thermal conductivity, co-efficient of thermal expansion, solubility and optical and mechanical properties.	General Principles of Dental Materials
	Interpret and label a stress-strain curve to determine various mechanical and physical properties.	
	Describe the fundamental physio-mechanical, biological, and chemical principles that determine the clinical behavior and performance of dental	

	materials.	
DMPD1-DM-002	Elaborate the structure of matter and explain the fundamental principles of adhesion among dental materials.	Structure of matter and adhesion
DMPD1-DM-003	Classify dental materials according to types, materials & uses.	Classification of Dental Materials
DMPD1-DM-004	Describe the concepts of safety and biocompatibility in dental biomaterials.	Biocompatibility and Safety
DMPD1-DM-005	Define key biological terms related to dental materials, including biocompatibility and hypersensitivity. Discuss the effects of toxicity and corrosion and their influence on the biological performance of dental materials.	Biological Considerations
DMPD1-DM-006	Define cast and die materials Define gypsum and identify various gypsum products used in dentistry. Describe the composition, hydration reaction, and crystal formation process of gypsum products.	Gypsum Products and Model Fabrication and die materials

	Classify gypsum products according to their composition and intended use in dental procedures. Discuss the ideal physical and mechanical properties, setting expansion, and setting time of gypsum products.	
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	Demonstrate or describe the correct proportioning, mixing, pouring, and trimming techniques for gypsum materials.	
	Identify and explain factors that influence the setting time, expansion, and strength of gypsum materials.	
	Explain infection control measures and safety precautions during the pouring and handling of impressions and models.	
	Analyze common causes of air bubbles, inaccuracies, and fractures in gypsum models and propose preventive measures.	
	List the advantages and disadvantages of gypsum and enumerate miscellaneous types of die materials.	
DMPD1 -DM-007	Classify impression materials used in dentistry according to setting mechanism and clinical use.	Impression Materials
	Describe the ideal properties and characteristics of impression materials.	
	Compare the advantages, disadvantages, and clinical indications of different impression materials.	
	Analyze the factors that affect the dimensional accuracy and surface detail of dental impressions.	
DMPD1 -DM-008	Describe methods for disinfecting and storing dental impressions to prevent distortion and cross-infection.	Infection Control

DMPD1	Describe the composition, setting mechanism, and classification of hydrocolloid impression materials	Hydrocolloid
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-DM-009	Explain the clinical steps for mixing, loading, and inserting hydrocolloid impression materials	Impression Materials
DMPD1 -DM-010	Identify and classify non-elastic impression materials and discuss their composition, properties, setting reactions and uses.	Non-elastic impression materials
	Evaluate the advantages and disadvantages of non-elastic impression materials.	
	Describe and differentiate between mucostatic and mucocompressive for complete denture impressions.	
PRE-CLINICAL PROSTHODONTICS		
CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
DMPD1 -PD-001	Define Prosthodontics.	Overview of Prosthodontics and Its Branches
	Comprehend various terminologies used in prosthodontics.	
	Comprehend the role of prosthodontics in oral rehabilitation.	
	Differentiate among major branches of Prosthodontics.	
DMPD1 -PD-002	Identify Kennedy's Classes I-IV.	Kennedy's Classification of Partial Edentulism
	Comprehend different modifications of Kennedy's classification.	
DMPD1 -PD-003	Apply Applegate's Rules governing the Kennedy's Classification.	Applegate's Rules
	Differentiate between tooth bounded and free end saddle areas.	

DMPD1 -PD-004	Identify different types of removable prosthesis used for replacement of missing teeth.	Interim partial denture
	Identify components of interim partial denture (types of teeth, retainer and denture base)	
	Comprehend the significance of components of interim partial denture.	
DMPD1 -PD-005	Define Retention.	Interim partial denture
	Comprehend different principles of retention used in prosthodontics.	
	Define Retainer and identify its different types for interim/ acrylic partial denture.	
	Comprehend properties of stainless-steel wrought alloy clasp material and its application in removable partial denture	

OPERATIVE DENTISTRY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
DMPD1- OD-001	Recognize different instruments used in tooth preparation.	Instrument s and armamenta riu m
	Describe their functions.	
	Differentiate between hand and rotary instruments.	
	Discuss the hazards of rotary instruments.	
DMPD1- OD-002	<p>Explain the importance of isolation in dental procedures, including its role in moisture control, visibility, infection control, and treatment success</p> <p>Enlist components of rubber dam</p> <p>Outline stepwise procedure for application of rubber dam.</p>	Isolation

DMPD1-OD-003	Discuss the principles of cavity preparation, including outline form, resistance form, retention form, and convenience form in ensuring the longevity and effectiveness of restorative treatments.	Fundamentals of tooth Preparations
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PRACTICAL / LAB WORK		
SCIENCE OF DENTAL MATERIALS		
CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
DMPD1-DM-011	Demonstrate and perform techniques for manipulation of hydrocolloid impression materials.	Impression Materials
	Demonstrate the mixing of alginate ensuring correct water-to-powder ratio giving accurate consistency and setting time.	
DMPD1-DM-012	Demonstrate the softening technique of the impression compound using a water bath without overheating the material.	Non-elastic impression materials
DMPD1-DM-013	Manipulate soft/hard plaster in the correct water/powder ratio to obtain a homogenous mix fit for model/die pouring	Gypsum
	Build a plaster slab following the allocated dimensional guidelines.	
	Demonstrate the technique of model pouring.	
	Demonstrate the process of fabricating dental cast/model including trimming and finishing of the study models.	
	Differentiate between study casts, working casts, and refractory casts based on purpose and fabrication.	
PRE-CLINICAL PROSTHODONTICS		

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
DMPD1-PD-001	Identify and remove specific teeth from a cast to simulate Kennedy's class III partial denture design.	Kennedy's Classification
	Identify and classify partially edentulous arches according to Kennedy's classification on casts.	

PRACTICAL / LAB WORK

SCIENCE OF DENTAL MATERIALS

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DMPD1-DM-012	Demonstrate the softening technique of the impression compound using a water bath without overheating the material.	Non-elastic impression materials
DMPD1-DM-013	Manipulate soft/hard plaster in the correct water/powder ratio to obtain a homogenous mix fit for model/die pouring	Gypsum
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PRE-CLINICAL PROSTHODONTICS		
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	Identify and classify partially edentulous arches according to Kennedy's classification on casts.	
DMPD1-PD-002	Fabricate a C-clasp for a removable partial denture.	C-Clasp Fabrication
DMPD1-PD-003	Fabricate occlusal rim; perform wax-up; articulate for both upper and lower partial dentures.	Wax-Up and Articulation for Partial Dentures
	Manipulation of base plate waxes to fabricate occlusal rims of standard dimensions.	
	Articulate upper and lower partial dentures.	
DMPD1-PD-004	Arrange upper and lower teeth as per the 5 planes (buccolingual, mesiodistal, occlusal plane, ridge relation, and rotational angle).	Dental Setup for Partial Dentures
DMPD1-PD-005	Demonstrate the process of flasking for both upper and lower partial dentures.	Flasking for Partial Dentures
DMPD1-PD-006	Perform dewaxing of flasks accurately while maintaining denture form.	Dewaxing for Partial Dentures
DMPD1-PD-007	Perform packing, curing, and finishing steps for both upper and lower partial dentures.	Packing, Curing, and

		Finishing of Partial Dentures
PRE-CLINICAL OPERATIVE DENTISTRY		
CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
DMPD1-OD-003	Identify instruments & equipment used in restorative work, their uses & handling.	Instruments and Armamentarium
DMPD1-OD-004	Perform single tooth isolation & quadrant isolation using rubber dam on typodonts in maxillary and mandibular arches.	Rubber Dam Application and Isolation Techniques
DMPD1-OD-005	Perform patient, operator position and instrument exchange.	Clinical Ergonomics
THEORY		
PHYSIOLOGY		
CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
HR-P-001	Explain the functional anatomy and vascular organization of the liver Discuss functions of the liver.	Vascular Anatomy and Functional Correlation of the Liver
	Differentiate between hemolytic and obstructive jaundice.	
	State the dental relevance of liver disease in coagulation and drug metabolism.	
HR-P-002	Describe physiological anatomy of the kidney and nephron	Anatomy of
	Explain physiological anatomy and innervation of the bladder	

	Describe the mechanism of micturition and its control	Renal System
HR-P-003	Explain the processes of glomerular filtration, tubular reabsorption	Primary physiological Function of Renal System
	State normal GFR and filtration fraction values explain determinants of GFR.	
	Describe the mechanism of autoregulation of GFR	
	Describe factors affecting GFR	
HR-P-004	Mention proportion of sodium, glucose and water reabsorbed in different parts of nephron.	Secondary Physiological function of renal system
	Explain regulation of fluid osmolality by osmoreceptor-ADH mechanism	
HR-P-005	Discuss normal constituents of urine	Clinical relevance of renal system
	Identify normal values/range of blood urea, and serum creatinine	
HR-P-005	Differentiate between acute kidney injury and chronic kidney disease.	Patho-Physiology of renal system
	Enlist causes of hypertension in kidney diseases	
	Define nephrotic syndrome, oliguria and anuria	
	State the dental relevance of chronic kidney disease	

BIOCHEMISTRY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
	Differentiate between L-alpha amino acids and alpha-keto acids (carbon skeleton).	
	Enumerate alpha-keto acids of alanine, glutamate, and aspartate.	

HR-B-001	Define transamination and explain its biochemical significance.	Nitrogen Removal from Amino Acids
	Describe the reactions catalyzed by alanine aminotransferase (ALT) and aspartate aminotransferase (AST)	
	Discuss the role of pyridoxal phosphate (PLP) in transamination reactions	
	Explain the diagnostic importance of AST and ALT	
	Define oxidative deamination and outline its physiological significance	
	Describe the reaction catalyzed by glutamate dehydrogenase (GDH)	
HR-B-002	Enlist sources of ammonia. Outline the two major mechanisms for transport of ammonia from peripheral tissues to liver. Enumerate transport forms of ammonia.	Sources and Transport of Ammonia
HR-B-003	Explain the reactions, regulatory mechanisms, and physiological significance of the urea cycle and state the normal blood urea levels.	Disposal of Amino Groups: Urea Cycle
HR-B-004	Describe the normal blood ammonia levels and explain the biochemical basis of ammonia-induced CNS toxicity.	Ammonia Metabolism and Hyperammonemia
	Enlist inherited & acquired causes of hyperammonemia.	
	Describe the effects of hyperammonemia on brain.	
	Discuss the dietary and pharmacological strategies used in its management of hyperammonemia.	
HR-B-005	Briefly describe the metabolism & importance of glutamine in human body.	Glutamine Metabolism
HR-B-006	Describe heme degradation and jaundice.	Heme Degradation and Jaundice
	Interpret elevated ALT and AST values in patient histories to anticipate potential bleeding risks and altered drug metabolism during dental treatment.	Liver Function

HR-B-007		and Clinical Correlation s in Dentistry
HR-B-008	Explain renal structure–function relationships underlying fluid balance, drug excretion, and homeostasis.	Renal structure- function
HR-B-009	Explain the renal mechanisms involved in hydrogen ion homeostasis.	pH Regulation Mechanism s

PHARMACOLOGY & THERAPEUTICS

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
HR-Ph-001	Classify 5 major types of diuretics and relate them to their sites of action Describe the major applications and the toxicities of acetazolamide, thiazides, loop diuretics, and potassium-sparing diuretics.	Diuretics
HR-PH-002	Apply dose-modification charts for analgesics, local anesthesia, and common antibiotics in hepatic patients.	Drug Dose Modificatio n in Hepatic Impairment

GENERAL PATHOLOGY & MICROBIOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
HR-Pa-001	Interpret basic liver function tests (ALT, AST, ALP, INR) to assess hepatic function and disease severity.	Liver Functi on Tests
HR-Pa-002	Explain the mechanisms of hepatic coagulopathies and relate them to increased bleeding risk.	Hepatic Coagulopathie s
HR-Pa-003	Explain and compare eGFR, CBC, and related renal function tests in distinguishing acute from chronic kidney disease.	Renal Function Tests

HR-Pa-004	Define and classify types of edema and explain their underlying causes.	Edema –Types and Mechanisms
HR-PA-005	Discuss the viral characteristics and diagnosis of HBV.	Blood Borne Hepatic Infection and Their Relationship to Patient Safety and Infection Control Module.
	Discuss the viral characteristics and diagnosis of HCV.	
	Discuss the window period in the diagnosis of HBV & HCV and its significance in dental surgery.	
	Discuss the vaccination of HBV & HCV and its importance for a dental surgeon.	
HR-PA-006	Discuss the viral characteristics and diagnosis of HAV.	Hepatic infection and their relationship to patient safety and infection control module.
	Discuss the viral characteristics and diagnosis of HDV.	
	Discuss the viral characteristics and diagnosis of HEV.	
	Discuss the vaccination of HAV and HEV	
HR-PA-007	Discuss briefly the life cycle and diseases caused by Entamoeba histolytica	Entamoeba histolytica

HR-PA-008	Discuss briefly the life cycle and diseases caused by Echinococcus granulosis	Echinococcus granulosis
HR-PA-009	Discuss briefly the bacteria that cause Urinary Tract Infection.	UTI
HR-PA-010	Discuss briefly the microbial characteristics, disease spectrum brief diagnosis, and renal infection caused by <ul style="list-style-type: none"> i. E. coli ii. Proteus iii. Staphylococcus saprophyticus iv. Klebsiella v. Pseudomonas 	Microorganisms causing renal infections
ORAL MEDICINE		
CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
HR-OM-001	Explain the oral implications of hepatitis, cirrhosis, and hepatic failure.	Oral Manifestations of Hepatic Diseases
HR-OM-002	Recognize hepatic conditions most relevant to general dental care and their impact on treatment planning.	Dental Considerations in Hepatic Disorders
HR-OM-003	Explain the principles of post-exposure prophylaxis (PEP) for Hepatitis B and Hepatitis C.	Infection Control and Post-Exposure Prophylaxis for Hepatitis
HR-OM-004	Interpret lab findings CBC, RFTs (urea, creatinine), Bleeding time and (PT, APTT, & INR) to plan dental treatment for acute and chronic renal conditions	Laboratory Interpretation and Dental Management in Renal Disorders

HR-OM-005	Describe the risk factors for patients undergoing renal dialysis associated with oral cavity.	Oral Health Considerations in Renal Dialysis Patients
HR-OM-006	Identify oral soft-tissue changes associated with hepatic disease and correlate them with underlying cholestatic mechanisms.	Oral Manifestations of Liver Disease
HR-OM-007	Interpret urea and creatinine levels and apply findings to modify dental treatment plans.	Dental Management in Renal Disease
HR-OM-008	Describe and relate the systemic and oral manifestations of CKD, nephrotic syndrome, and dialysis dependency.	Oral Manifestations of Renal Disease

BEHAVIORAL SCIENCES

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
HR-BhS-001	Explain the principles for communicating diagnoses, treatment modifications, and infection-control measures to patients with hepatic disease in a clear, non-stigmatizing manner.	Communication
HR- BhS-002	Explain the OARS motivational interviewing (MI) micro-skills and describe how they can be applied to improve patient adherence to liver and kidney health recommendations	Motivational Interviewing Skills
HR- BhS-003	Explain the principles and appropriate use of shared-decision tools in developing a bleeding-risk mitigation plan collaboratively with the patient and the physician	Shared Decision-Making

HR- BhS -004	Describe the principles and rationale of anxiety-reduction techniques (such as tell–show–do and paced breathing) used when preparing medically compromised patients for dental procedures.	Anxiety-Reduction Techniques
HR- BhS -005	Discuss ethical dilemmas encountered in pain management for patients with liver disease and explain the rationale for an appropriate, justified prescribing decision	Ethical Considerations
HR- BhS -006	Describe communication and professionalism challenges encountered in clinical practice and outline a monthly goal to improve one specific aspect.	Reflective Practice
HR- BhS -007	Explain principles of patient-centred communication and shared decision-making.	Principles of Patient-Centred Communication
HR- BhS -008	Explain the principles of patient-centred communication and shared decision-making in the management of individuals with hepatic disease.	Application of Patient-Centred Care
HR- BhS -009	Explain the process of coordinating referrals and follow-up with hepatology services using structured communication templates and shared electronic records.	Interdisciplinary Coordination and Continuity of Care
HR- BhS -010	Explain strategies for providing patient education on prevention and postoperative care using clear, literacy-appropriate written and verbal instructions.	Patient Education and Health Literacy in Dental Practice

PRACTICALS/LAB WORK

BIOCHEMISTRY

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
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HR-B-010	Estimate blood urea levels using standard biochemical methods and interpret results in relation to renal function.	Estimation of Blood Urea
HR-B-011	Estimate serum creatinine concentration and interpret findings to assess glomerular filtration efficiency.	Estimation of Serum Creatinine
HR-B-012	Estimate total and direct serum bilirubin and interpret values to differentiate between hemolytic, hepatic, and obstructive jaundice.	Estimation of Total and Direct Bilirubin

PHARMACOLOGY & THERAPEUTICS

CODE	SPECIFIC LEARNING OUTCOMES	TOPIC
HR-Ph-003	Demonstrate correct prescription writing by accurately completing all components	Principles and Guidelines of Prescription Writing
HR-Ph-004	Perform dose calculations for medications requiring adjustment in renal and hepatic impairment	Dose Adjustment Strategies in Renal and Hepatic Impairment