



BDS Year-I

Revised Curriculum (Version-II)

**NATIONAL UNIVERSITY OF MEDICAL
SCIENCES**

INTRODUCTION

a. **Preamble**

The recently revised standards by the Pakistan Medical and Dental Council (PM&DC) encourages integration of major subjects both horizontally and longitudinally. This curriculum meets the standards of Pakistan Medical and Dental Council and our students, on completion of program will develop required competencies as defined worldwide in a graduate doctor.

BDS Years I will deal with the normal structure, function and biochemical aspects of topics relevant to dentistry which will be delivered in an integrated manner in clinical context. This curriculum also aims to improve different skills of the future dentists including communication, leadership & management and research skills and inculcate ethical values and professionalism

This curriculum has been developed by the BDS faculty from constituent/affiliated colleges in collaboration with NUMS Academic Directorate

b. **Curriculum perspective**

NUMS curriculum is evolved taking into consideration Constructivist, Cognitivist, behaviorist with some element of Constructivist approach. It allows students to construct their own knowledge based on what they already know and to use that knowledge in purposeful activities requiring decision making, problem solving, and judgments.

c. **Level of integration**

The approach is discipline-based with clinical relevance.

d. **Competencies**

The focus of this curriculum is on the roles of a general physician as identified in the can MEDS. These are Medical Expert, Manager, Communicator, Health Advocate, Collaborator, Professional and Scholar. Competencies focused in year I are.

- 1) Medical Knowledge
- 2) Problem solving
- 3) Procedural skills
- 4) Communication skills
- 5) Empathy
- 6) Professionalism

- 7) Leadership and Management skills
- 8) Research skills

e. **Outcomes**

By the end of first year, students should be able to:

- 1) Correlate the developmental and anatomical knowledge of cell, nerve, muscle, bone, GIT, cardiovascular, respiratory systems, brain & Spinal cord and Head & Neck to their physiological and biochemical basis.
- 2) Relate the knowledge of oral biology for understanding relevant clinical scenario
- 3) Analyze multiple perspectives of ethics, Islamic and Pakistan studies

f. **Proposed Contact Hours Distribution Year-I**

First Year BDS Distribution of Hours	
SUBJECTS	FIRST YEAR
Anatomy	300
Physiology	300
Biochemistry	170
Oral Biology and Tooth Morphology	180
Islamiyat	20
Pakistan Studies	15
TOTAL HOURS	985

ACADEMIC CALENDAR(MODULES)

Blocks	BLOCK-I 11+1= 12 weeks			BLOCK-II 11+1= 12 weeks			BLOCK-III 11+1= 12 weeks		
Duration	02 wks	04 wks	05 wks	03 wks	03 Wks	05 Wks	04 Wks	04 Wks	03 Wks
Modules	Foundation	Cell & Genetics	CVS & Respiration	Digestive system & Metabolism	Renal system	Craniofacial - I	Craniofacial- II	Neuroscience	Endocrinology & Reproduction

g. **Educational Strategies**

- 1) Lectures
- 2) Small group discussion
- 3) Lab practical
- 4) Skill lab
- 5) Integrated Session
- 6) Problem based learning/ Case based learning
- 7) Tutorials

h. **Resources.** To be filled in by the institute

- 1) Faculty
- 2) Facilities
- 3) Administration for Course
- 4) Administrative structure
- 5) Communication with students

i. **Internal Assessment**

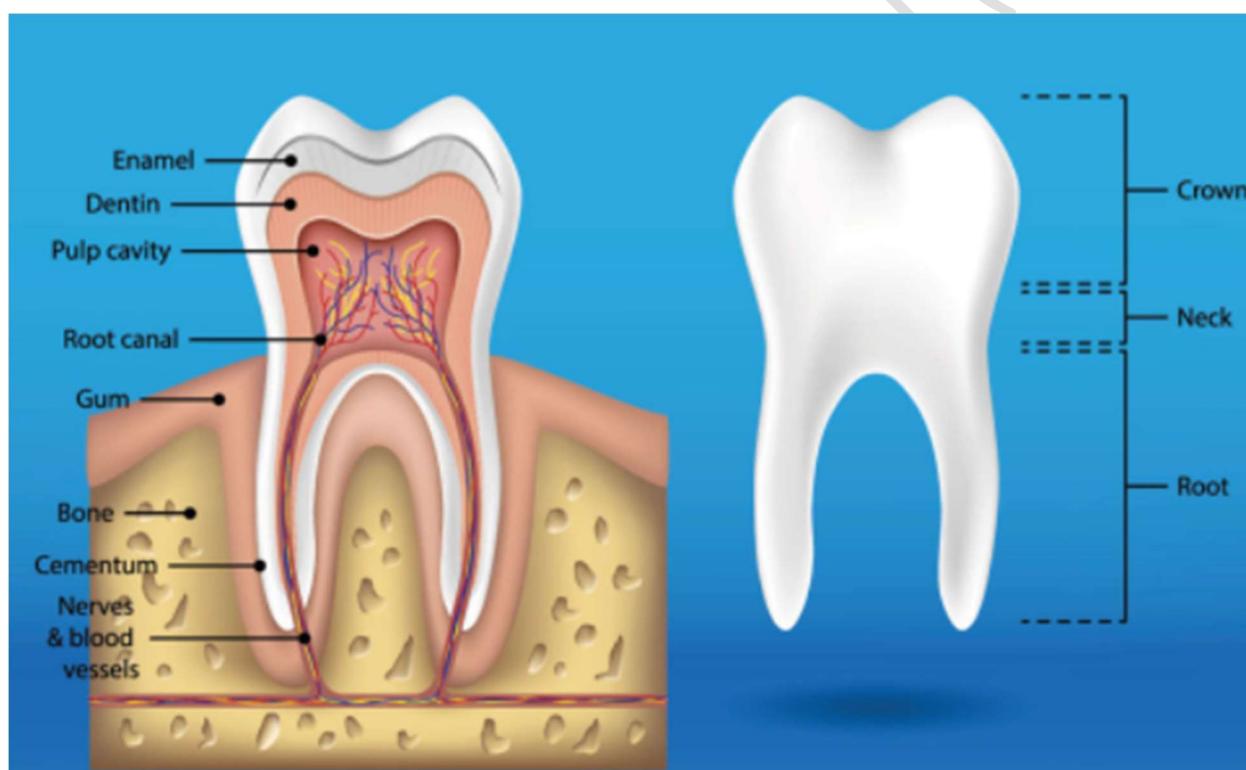
Students will be assessed at the end of each block. The weighting of internal assessment is 20% in 1st professional BDS Examination. There will be three end of blocks and one pre -annual examination. The scores of tests of each end block assessment and pre-annual examination will be used for calculation of the internal assessment.

j. **Annual Professional Examination.**

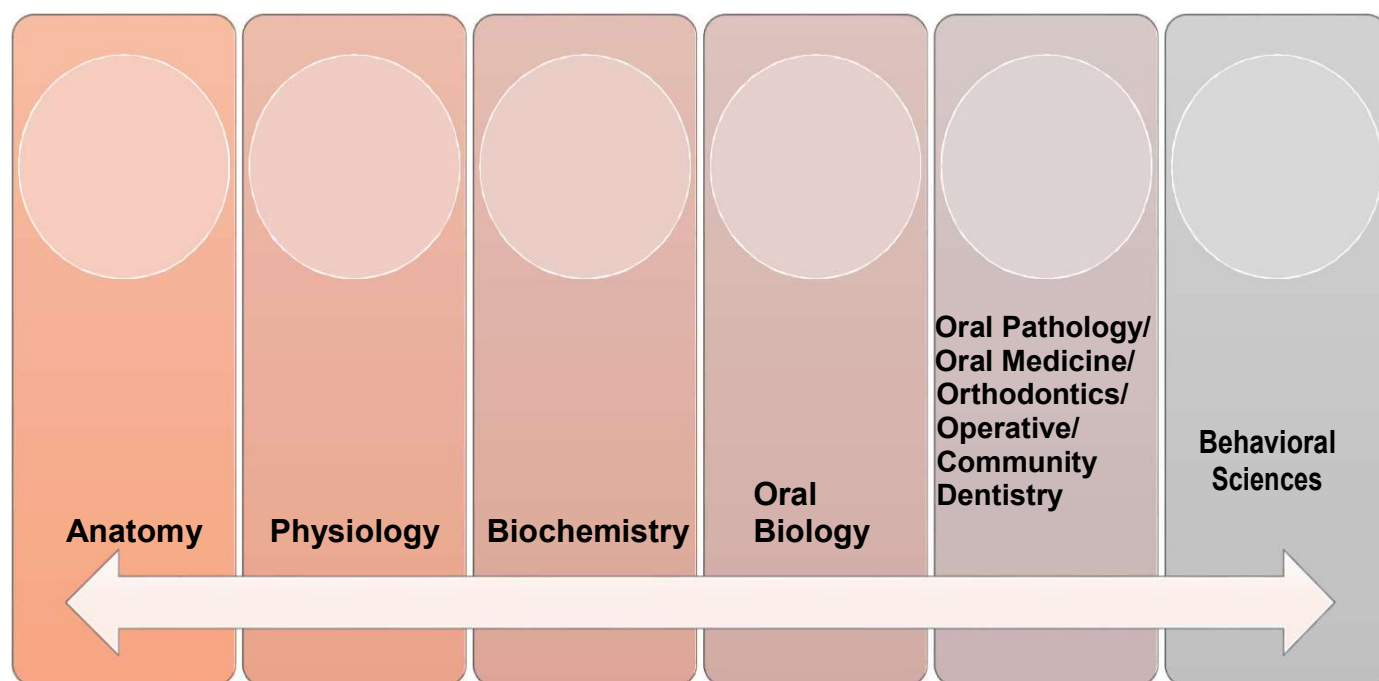
The University will take the first professional Examination as per PM&DC guidelines at the end of the academic year. Annual Theory & Practical Examination will be of 200 marks for Anatomy, Physiology, Biochemistry, Oral Biology and 100 marks theory paper of Islamiat & Pakistan Studies. The passing score is 50% in theory and practical separately.

k. **Evaluation of the Course.** To be filled in by the institute

BDS YEAR I
BLOCK I
MODULE I
FOUNDATION
Duration: 02 weeks



Integration of Disciplines in Foundation Module



MODULE PLANNING COMMITTEE

Module Coordinator	To be filled by the institutes
Members	

ANATOMY				
Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructional Strategy	Assessment Tool
	By the end of the module students will be able to:			
General Anatomy				
Introduction to anatomical terms and planes	Comprehend basic terminology and planes of the sections to facilitate further knowledge	Knowledge Define different disciplines of Anatomy Identify terms of position in relation to anatomical position: <ul style="list-style-type: none">• Anterior /Posterior• Ventral /Dorsal• Superior /Inferior• Caudal / Rostral / Cranial• Medial /Lateral• Proximal /Distal• Palmar /plantar• Superficial/Deep• Supine /Prone Identify the following anatomical planes with the help of diagrams. <ul style="list-style-type: none">• Coronal• Sagittal• Horizontal• Parasagittal Identify the various techniques to study anatomy in the living such as Plain radiographs Skill: Identify type of section on a model Demonstrate normal anatomical position in a SP	<ul style="list-style-type: none">• Lectures• SGD	<ul style="list-style-type: none">• MCQ• SAQ/SEQ/ OPSE/ Structured viva
	Appraise the movements occurring at different	Knowledge Identify the terms of movements with general reference to	<ul style="list-style-type: none">• Lectures• SGD	<ul style="list-style-type: none">• MCQ• SAQ/SEQ• OPSE/ Structured

	types of movements occurring at different joints of the body .	<p>the axis and planes in which they occur</p> <ul style="list-style-type: none"> • Flexion /Extension • Abduction /Adduction • Lateral rotation / Medial rotation • Pronation /Supination • Plantar flexion / Dorsal flexion • Circumduction • Eversion /Inversion <p>Skill: Demonstrate these movements in a subject</p>		viva
Osteology	Summarize the general features of bones.	<ul style="list-style-type: none"> • Identify the axial and appendicular parts of a human skeleton. • Classify bones according to their development and shape giving examples of each type especially from head and neck (wherever possible). • Describe the process of both types of ossification • Describe blood supply of the long & diploic bones 		
Myology	Appraise the general features of muscles	<p>Classify muscles into three basic types</p> <p>Correlate skeletal muscles according to their shape, Muscle fibre types and functions with examples of each type</p>		
Arthrology	Anatomize the general Features of joints Classify joints According to their structure with examples of each type especially from head and neck	<p>Describe the general structure of a synovial joint</p> <p>Discuss anatomy of joints with reference to dislocation, sprain, and inflammation</p> <p>Describe Hilton's law</p>		

	(wherever possible)			
PHYSIOLOGY				
Introduction	Comprehend the basic concepts of Physiology	Describe the organization of human body (from cell to multicellular organism)	LGIS	Assignment
BIOCHEMISTRY				
Introduction to Biochemistry	Comprehend the basic concepts of biochemistry	<ul style="list-style-type: none"> What is Biochemistry? The scope of biochemistry <ul style="list-style-type: none"> Importance of biochemistry 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured viva
ORAL BIOLOGY				
Introduction to orofacial structures	Comprehend the orofacial structures to facilitate further knowledge	Identify the names and locations of skeletal, dental and soft tissue structures present in orofacial region.	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ Viva OSPE
Introduction to tooth morphology	<ul style="list-style-type: none"> Classify dentition Differentiate different tooth numbering system Identify oral and other associated dental structures Relate normal tooth forms and alignment to its function and form the basis of physiologic considerations of teeth and 	<ul style="list-style-type: none"> Identify either deciduous or permanent teeth by their proper name, when given a diagram or description of their function, arch position, or alternative name. Identify the type and number of deciduous or permanent teeth per quadrant, arch, and in total. Identify the type and number of teeth which are anterior or posterior. Describe the proper definition, and select the correct definition or description from a list, for 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured viva

	<p>their supporting structures</p>	<p>any structure presented in the sections covering general anatomy and anatomical structures.</p> <ul style="list-style-type: none"> ▪ Demonstrate knowledge of dental formulae by supplying, or selecting from a list, the correct information regarding a given dental formula. ▪ Indicate the normal eruption sequence, or order, for deciduous and permanent teeth, by listing, or selecting from a list, the proper sequences. ▪ Define and correctly identify from a list, the three periods of human dentition, as well as identify the approximate time intervals of their existence, and normal initiation and termination events. ▪ Define the term "succedaneous", and be able to select from a list the tooth or teeth which are succedaneous. ▪ Identify and select from a list, the proper name for tooth surfaces, or thirds of tooth surfaces, when given a diagram or description. ▪ Demonstrate knowledge of the various dental numbering systems by the correct symbol for a given name or description. 		
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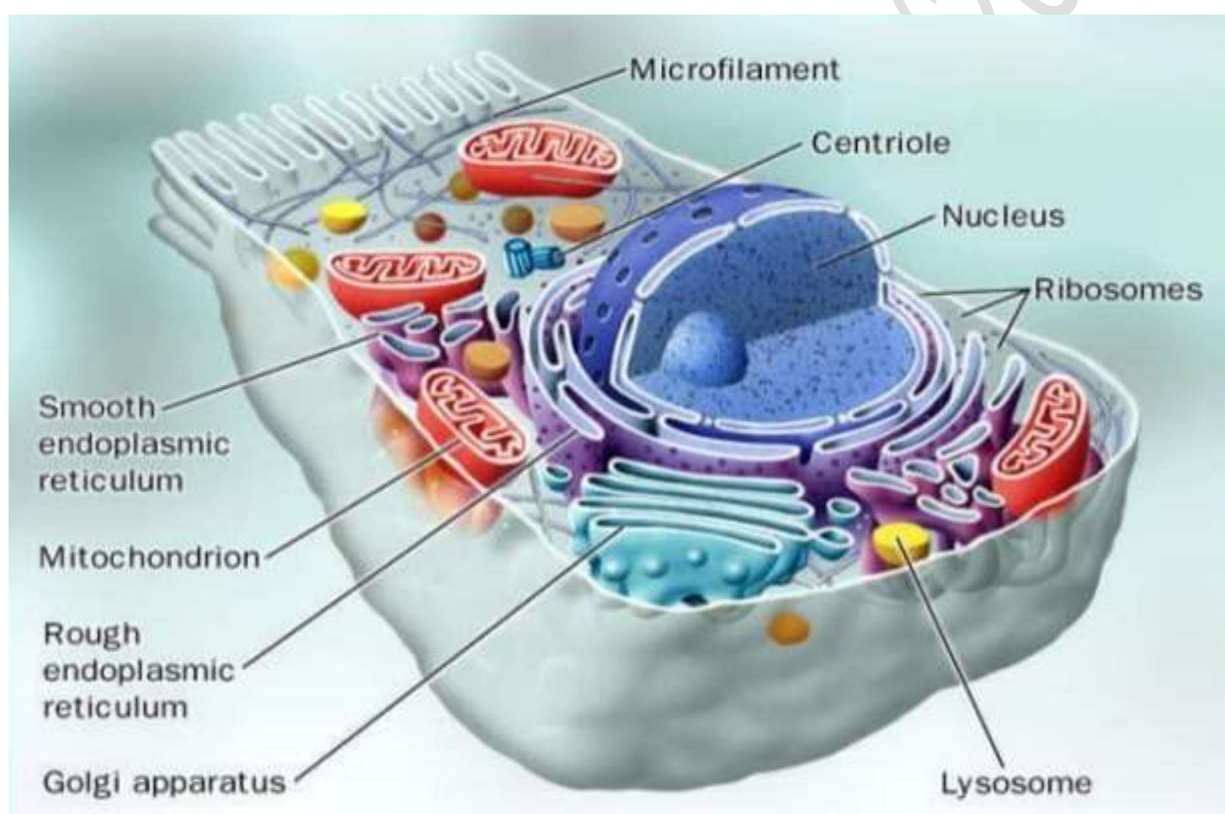
		<ul style="list-style-type: none"> ▪ Differentiate between the following terms by correctly defining and by selecting the proper response from a series of definitions or their applications. <ul style="list-style-type: none"> ○ Periodontium ○ Lobe ○ Curve of Spee ○ Curve of Wilson ○ Compensating Occlusal curvature ○ Axial position ○ Contact area Interproximal space Embrasure Line angle ○ Height of contour Cervical line, Gingival line, Epithelial attachment ▪ Name the three major functions of the human dentition, or select the correct response from a series of choices which relate to these functions or their applications. ▪ Select the correct response from a series of choices which describe the steps involved in the evolution of the human dental mechanism, or how these steps relate to form and function. ▪ Provide an understanding of lobes by correctly selecting from a series of choices, or identifying from 		
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		<p>a two -dimensional diagram, the number and names of the lobes of the anterior and posterior teeth, the major portions of each tooth which compose lobes, and the major structures separating lobes.</p> <ul style="list-style-type: none"> ▪ Differentiate between the general axial positions of the various permanent teeth. ▪ Differentiate between the crown surfaces of teeth by matching them with their correct general shape (triangular, trapezoidal, or rhomboidal), or by relating the shape to the specific function of the tooth. ▪ Describe and differentiate between contact areas by correct information which relates to the: <ol style="list-style-type: none"> 1. Two purposes served by proper contact areas. 2. General rules of size and location on individual teeth, differences between the contact areas of anterior and posterior teeth and changes in contact areas occurring with age. ▪ Describe the components, boundaries and functions of the interproximal space. 		
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		<p>I. Describe and differentiate between embrasures by</p> <ol style="list-style-type: none"> 1. Information regarding the two purposes embrasures serve. 2. Information regarding the general rules of normal embrasure form. 3. Names of embrasures, when given a description or two - dimensional diagram. <ul style="list-style-type: none"> ▪ Describe the proper location of the height of contour on the facial and lingual surfaces of the teeth, and its major contribution to gingival health. ▪ Differentiate between the levels, depths, and directions of curvature of the cervical lines on all surfaces of both anterior and posterior teeth. ▪ Describe the proper location and form of marginal ridges and facial line angles and their relationship to embrasure form. In addition, the student will be able to identify the normal location of central grooves and occlusal anatomy of posterior teeth in the same manner. ▪ Identify and make applications to the type of 		
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		<p>root structure necessary for proper function of the different teeth, and the general rules regarding tooth roots and normal number of branches.</p> <ul style="list-style-type: none"> ▪ Demonstrate knowledge of the protective functional form of the teeth, by correctly labeling, or choosing between diagrams which illustrate proper and improper form and by matching specific tooth form with its complementary physiologic activity 		
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BDS YEAR I
BLOCK I
MODULE II
CELL STRUCTURE & FUNCTION
Duration: 03 weeks



Integration of Disciplines in Module II

ANATOMY				
Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructional Strategy	Assessment Tool
	By the end of the module students will be able to:			
Gametogenesis	Elaborate the development of germ cell	<ul style="list-style-type: none"> • Revisit cell division, mitosis & meiosis • Describe the events of spermatogenesis • Describe the events of spermiogenesis • Describe the relation of ovarian cycle with maturation of follicles. • Describe the stages of follicular maturation <ul style="list-style-type: none"> -Primary -Preantral -Secondary -Preovulatory. • Describe the process of ovulation and correlate its timing with ovarian cycle. • Define fertilization • State normal site of fertilization • Describe the results of fertilization • Enlist the factors affecting fertilization • Enumerate the changes that occur in spermatozoa before fertilization • Explain the factors affecting penetration of sperm through the zona pellucida for formation of Pro-nuclei. 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ/ OPSE/ Structured viva

First week of Development	Appraise the events of first week of development of the embryo	<ul style="list-style-type: none"> • Appraise the implantation and its normal site • Describe the changes in uterus at time of implantation. • Explain the process of cleavage • Explain the formation of morula and blastula • Describe the formation of inner and outer cell mass within the blastocyst cavity • Appraise abnormal sites for implantation (ectopic pregnancy) and its clinical significance. 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ/OPSE/Structured viva
Second week of development	Appraise the events of second week of development of the embryo	<ul style="list-style-type: none"> • Discuss the formation of bilaminar embryonic disc from embryoblast. • Describe early differentiation of trophoblast • Explain the formation of amniotic cavity • Explain the formation of chorion, secondary yolk sac and chorionic plate. • Explain the establishment of uteroplacental circulation. • Appraise 2nd week as week of twos. 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ/OPSE/Structured viva
Third week of development	Appraise the events of third week of development of the embryo	<ul style="list-style-type: none"> • Define gastrulation (formation of three germ layers) • Discuss the development, significance and fate of primitive streak • Describe the development of notochordal process, notochord canal, prechordal plate and cloacal membrane • Compare the topographic arrangement and derivatives 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ/OPSE/Structured viva

		<p>of three components of intraembryonic Mesoderm (Paraxial, Intermediate and Lateral Plate Mesoderm)</p> <ul style="list-style-type: none"> • Describe early development of CVS. • Describe differentiation of trophoblast during third week and formation of primary, secondary and tertiary chorionic villi • Enumerate the parts of placenta • Explain formation and fate of allantois. 		
HISTOLOGY				
Cell	Appraise the light microscopic structure of the cells	<p>Knowledge</p> <ul style="list-style-type: none"> • Introduction to histology, microscope • Differentiate between acidophilic and basophilia. • Enumerate different cell organelles and identify staining reaction of each. • Illustrate shapes of different cells with example • Enumerate different components of the cytoskeleton. • Correlate the structure of different type of intercellular junctions with their functions. <p>Skills</p> <ul style="list-style-type: none"> • Focus the prepared slide at different magnifications. • Draw the labeled diagram of cells having various shapes. 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ/OPSE/Structured viva
Epithelium	Appraise the light microscopic	<p>Knowledge</p> <ul style="list-style-type: none"> • Define epithelium • Compare surface Epithelium with examples of each type. 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ/OPSE/

	structure of epithelial tissue	<ul style="list-style-type: none"> • Classify glandular epithelium with examples of each type. • Compare the ultrastructure of microvilli, stereocilia and cilia and correlate with their roles in various cellular functions • Classify glands according to their morphology, secretory products and mode of secretion with examples of each type Skills <ul style="list-style-type: none"> • Identify different types of epithelia under light microscope and enlist at least two identification points for each type. • Draw labelled diagrams of each type of epithelium. • Compare and contrast between the histological structure of serous and mucous secreting cells. • Draw labelled diagram of mucous and serous acini 		Structured viva
Connective tissue	Appraise the light microscopic structure of connective tissue	Knowledge <ul style="list-style-type: none"> • Define connective tissue and list three basic components of connective tissue. • List different types of cells and fibers in the connective tissue. • Compare various types of connective tissue with example of each type. • Summarize a brief account of histological features of different types of connective tissue. Skills <ul style="list-style-type: none"> • Identify the slides of loose 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ/OPSE/Structured viva

		<p>connective tissue, dense regular, dense irregular and adipose connective tissue under light microscope and list at least two identification points of each type.</p> <ul style="list-style-type: none"> • Draw labelled diagrams showing light microscopic structure of loose connective tissue, dense regular, irregular and adipose connective tissue 		
Muscle		<p>Knowledge</p> <ul style="list-style-type: none"> • Differentiate the microscopic features skeletal, smooth and cardiac muscle while correlating with their functions. • Explain the histological differences of different types of muscles. <p>Skills</p> <ul style="list-style-type: none"> • Identify microscopic sections of different types of muscle under light microscope and list at least two identification points of each type • Draw labelled diagrams showing light microscopic structure of different types of muscles. 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ/ OPSE/ Structured viva
Bone	Appraise the light microscopic structure of bone	<p>Knowledge</p> <ul style="list-style-type: none"> • Compare microscopic structure of compact and cancellous bone. • Correlate the process of bone remodeling with tooth bracing and adjustment. <p>Skills</p> <ul style="list-style-type: none"> • Identify the slides of cancellous and compact bone under light microscope 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ/ OPSE/ Structured viva

		<p>and list at least two identification points of each type.</p> <ul style="list-style-type: none"> • Draw labelled diagrams showing light microscopic structure of cancellous and compact bones. 		
PHYSIOLOGY				
CELL & GENERAL PHYSIOLOGY				
Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Homeostasis	Appraise functional Organization of the Human Body and Control of the "Internal Environment"	<ul style="list-style-type: none"> • Recognize the interplay of various organ systems in maintaining homeostasis. • Identify the role of feedback mechanisms (positive, negative, feed forward) in maintaining 'internal milieu'. • Differentiate between composition of intracellular and extra cellular fluid 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva
Cell Physiology	Relate the structure of cell and its various components to metabolic processes, genetic control and locomotion	<ul style="list-style-type: none"> • Revisit the structure and function of the cell and its organelles (cell Membrane, cytoplasmic organelles, nuclear membrane, nuclear organelles) • Classify various • Compare and contrast modes of transport of substances across the cell-membrane with examples • (osmosis, diffusion, facilitated diffusion, primary active transport, secondary active transport) 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva
NERVE & MUSCLE				
Membrane Potentials	Differentiate various types and phases of action	<ul style="list-style-type: none"> • Appraise basis of development of membrane potential across excitable 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured

and Action Potentials	potentials on the basis of nerve morphology, concentration of ions in body fluid compartments and clinical significance.	membrane. <ul style="list-style-type: none"> • Recognize Nernst potential and its importance in generation of membrane potential. • Identify various factors/mechanisms responsible for the genesis of membrane potential (role of channels, carrier proteins, stimuli). • Illustrate different phases of action potential mentioning details of ionic changes occurring during each phase of action potential. • Distinguish types and importance of refractory period. • Differentiate between myelinated and non-myelinated nerve fibers based on their structure and characteristics. 		viva
Excitation contraction coupling and NMJ	Correlate the physiological mechanism of Neuromuscular, Transmission and Excitation-Contraction Coupling with various neuromuscular diseases.	<ul style="list-style-type: none"> • Tabulate macroscopic, microscopic, functional differences of smooth, skeletal and cardiac muscle • Illustrate neuromuscular junction, sequence of events taking place during neuromuscular transmission • Explain the physiological importance of a motor unit • Describe the ionic and chemical basis of muscle contraction. • Distinguish between phases of muscle contraction in detail. • Relate the pathophysiology of neuromuscular 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva

		transmission in myasthenia gravis		
Excitation and Contraction of Smooth Muscle	Appreciate characteristics of smooth muscle contraction with their physiological significance.	Describe the role of SER in smooth muscle contraction.	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva

Practicals /SGDs:

1. Microscopy
2. Record the Blood Pressure of an SP using palpatory and Auscultatory Method.
3. Record the effects of posture and Exercise on Blood Pressure

BIOCHEMISTRY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Biochemistry of cell	Discuss the biochemical basis of cell	<ul style="list-style-type: none"> • Introduction to cell (biochemical point of view) • Comprehend various cytology techniques for study of cell (differential centrifugation) • Biochemical composition of cell <ul style="list-style-type: none"> ➤ Enumerate and describe various Cell Organelles in detail (Nucleus, Mitochondria, Ribosomes, Golgi Apparatus, Endoplasmic Reticulum, Lysosomes and Peroxisomes) ➤ Elaborate genetic control of cellular functions with help of a diagram • Outline the role of various cell 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva

		Organelles in various cellular metabolisms.		
Biological Membranes	Relate the concept of chemistry and role of signal transduction in health and disease	<ul style="list-style-type: none"> Biochemistry of cell membrane-chemical composition, Importance of lipid, carbohydrates and proteins in membranes Biomedical Importance of selectively permeable membranes Chemistry of signals and receptors Mechanisms of signal transduction (e.g. G Proteins associated pathways) Biochemistry of membrane transport mechanism -active transport, Passive transport, simple and facilitated diffusion and their biomedical role in human body 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structure d viva
Genetics	Apply the knowledge of genetics and molecular biology in treatment of diseases	<ul style="list-style-type: none"> Overview of replication, transcription & translation (not the steps) Mutations Role of genetics in cancer development Molecular Biology technique-PCR Molecular Biology and role in treatment of diseases 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structure d viva
Practicals: Blood sample collection and storage Safety in laboratories Introduction to use of glassware Introduction to use of Laboratory Equipment-I				

- **Micro lab**
- **Incubator**
- **Water Bath**

Introduction to use of Laboratory Equipment-II

- **Hot Air Oven**
- **Centrifuge Machine**
- **Electric Balance**
- **pH Meter**

ORAL BIOLOGY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
General Embryology	Relate the knowledge of human development to its clinical significance	<ul style="list-style-type: none"> • Define fertilization, zygote, embryo, germ layer, notochord, • morula, blastocyst, trophoblast, neural crest cells • Describe germ layer formation and fate • Describe neural crest cells in terms of formation, migration, • Role in orofacial development and associated anomalies • (Treacher Collins syndrome) • Enumerate derivatives of ectoderm, endoderm, mesoderm, 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<ul style="list-style-type: none"> • neural crest cells, pharyngeal arches, pouches and clefts • Describe and identify development of face in terms of processes involved and their role in formation of lips, nose, forehead, cheeks and jaws • Discuss and identify in pictures/images developmental anomalies associated with incomplete fusion of facial processes (unilateral, bilateral and median cleft lip, oblique facial cleft, median cleft/frontonasal dysplasia, lateral facial cleft, mandibular cleft) • Discuss etiological factors responsible for congenital defects affecting facial development 		
Development of mandible, maxilla, palate & tongue	<ul style="list-style-type: none"> ▪ Relate the knowledge of orofacial development to its clinical significance 	<ul style="list-style-type: none"> • Describe and identify development of primary and secondary palate in terms of time frame, processes involved, fusion of shelves and associated anomalies (cleft palate and its types) 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<ul style="list-style-type: none"> • Describe the development of tongue • Describe development of thyroid gland • Describe the developmental of mandible in terms of growth cartilages (names, period of activity, role and fate of primary and secondary growth cartilages), ossification centers, spread of ossification, post-natal growth • Describe the formation of different components of mandible; condyle, ramus, coronoid process and body of mandible • Describe the prenatal growth of maxilla in terms of time frame, processes involved, location of ossification center, spread of ossification, name, location, role and fate of growth cartilages • Describe postnatal growth of maxilla in terms of theories associated with growth (functional 		
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		<p>matrix, cartilage growth, sutural growth), bone remodeling and its impact on growth and position of maxilla</p> <ul style="list-style-type: none"> • Draw and label and identify in images/models both developing and mature mandible bone 		
Development of tooth	Relate the knowledge of tooth development to its clinical significance	<ul style="list-style-type: none"> • Describe sequence of developmental changes occurring in maxillary and mandibular processes in areas of future dental arches during 6th & 7th weeks of intra uterine life • Define the following terms/structure: neural crest cells, ectomesenchyme, primary epithelial band, dental lamina, vestibular lamina, tooth bud, lateral lamina, successional lamina, epithelial pearls/Rest cells of Serres, Enamel organ, dental papilla, dental follicle, cervical loop, enamel knot, enamel cord, enamel niche, enamel septum, enamel navel, 	<ul style="list-style-type: none"> ▪ Lectures <ul style="list-style-type: none"> ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<p>papillary layer, reduced enamel epithelium, pulp limiting membrane, rest cells of Malassez</p> <ul style="list-style-type: none"> • Identify on a histological picture/slide the following structures: Oral Epithelium, Mesenchyme, Dental lamina, vestibular lamina, tooth bud also draw and label • Distinguish, in a table, between dental and vestibular lamina on basis of development, location, histology, function, and fate • Explain components/parts of dental lamina on basis of developmental timings & their attachment to primary, permanent and non-succedenous tooth buds • Identify components of dental lamina in histological pictures/slides (lateral lamina, successional lamina) • Explain the clinical significance of 		
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		<p>remnants of dental lamina(epithelial pearls) i.e. eruption cysts, odontome, supernumerary tooth</p> <ul style="list-style-type: none"> • Explain histological aspects of bud, cap and bell stages of tooth development with emphasis on cell shapes, types of cell layers and function of each cell layer (outer enamel epithelium, inner enamel epithelium, stratum intermedium, stellate reticulum) • Identify draw and label enamel organ, dental papilla and dental follicle along with stages of tooth development in histological pictures (bud, early and late cap stage, early and late bell stage) • Describe composition, location, histological appearance (arrangement of fibers, condensation) & fate of dental papilla and dental follicle/sac • Describe location, histological appearance (cell shape) & function of enamel knot, 		
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		<p>enamel cord and enamel niche</p> <ul style="list-style-type: none"> • Identify enamel knot, cord and niche in histological pictures • Discuss importance and process of angiogenesis in relation with the developing tooth germ with reference to location and timings • Discuss relation of developing nerve fibers with early tooth germ with reference to location and timings • Explain inductive influences of inner enamel epithelial cells of enamel organ and peripheral cells of dental papilla on each other • Describe histodifferentiation, function and movement of enamel and dentin forming cells (ameloblasts and odontoblasts) in relation to each other • Explain source of nourishment for ameloblasts and odontoblasts during hard tissue 		
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		<p>formation</p> <ul style="list-style-type: none"> • Describe the formation, histological structure, role and fate (disintegration and rest cells of Malassez) of Hertwig epithelial root sheath in formation of roots of single and multi-rooted teeth • Identify draw and label HERS, Rest cells of Malassez and root formation in histological pictures • Describe clinical relevance of Hertwig epithelial root sheath (lateral canals/accessory canals formation, cyst development) • Explain relevance of root formation and root completion with tooth eruption in oral cavity with emphasis on time required for primary and permanent teeth • Explain the abnormalities expected to occur during tooth development in relation with tooth size and number (microdontia, macrodontia, 		
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		hypodontia, anodontia, supernumery and supplemental teeth)		
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BDS Curriculum Year-I (2023)

BDS YEAR I
BLOCK I
MODULE III
HAEMATOLOGY & IMMUNOLOGY
Duration: 03 weeks

Integration of Disciplines in Module III

ANATOMY				
Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructiona l Strategy	Assessment Tool
	By the end of the module students will be able to:			
Week 6- 8		Hematology & Immunology		
GENERAL EMBRYOLOGY				
Embryonic period (3-8 wks)	Appraise the early weeks of development of embryo	<ul style="list-style-type: none">• Define neurulation.• Describe process of formation of neural plate, neural tube and neural crest cells.• List derivatives of:<ul style="list-style-type: none">- Surface ectoderm- Neurectoderm- Neural crest- Intraembryonic mesoderm (paraxial, intermediate, lateral plate)- Endoderm• Describe early differentiation of somites• Describe the development of intraembryonic coelom.• Describe the folding of the embryo in the median plane and correlate it with its consequences• Describe the folding of the embryo in the horizontal plane and correlate it with its consequences• Describe relocation of connecting stalk to the• anterior abdominal wall and its differentiation into umbilical cord. Skills	Lectures/ SGD	<ul style="list-style-type: none">▪ MCQ▪ SEQ▪ Viva /OSPE

		<ul style="list-style-type: none"> Identify the structures related to general development on given models of general embryology 		
Histology				
Lymphoid system	Appraise histological structure of different components of lymphoid system	Knowledge <ul style="list-style-type: none"> Enumerate different types of lymphoid cells and identify their distribution in the body Describe the histological features and cells of the lymphoid system Describe the histological features of tonsils, thymus, lymph node and spleen. Skills <ul style="list-style-type: none"> Identify histological sections of tonsils, thymus, lymph node and spleen. under light microscope and list at least two identification points of each. 	Lectures/ SGD	<ul style="list-style-type: none"> MCQ SEQ Viva /OSPE
GROSS ANATOMY				
Neurovascul aure of limbs	Correlate anatomy of nerves and vessels of limbs with common clinical presentations.	Knowledge <ul style="list-style-type: none"> Outline the formations, divisions and branches of the brachial plexus Outline the area of supply of axillary, radial, ulnar, median and sciatic nerves. Trace the route of main arteries and veins of upper and lower limbs. Analyze the clinical importance of vessels present in the cubital fossa. Identify veins commonly used for cannulation Elucidate the clinical significance of brachial and radial artery with reference to pulse and BP monitoring. 	Lectures/ SGD	<ul style="list-style-type: none"> MCQ SEQ Viva /OSPE

		<ul style="list-style-type: none"> Enumerate arteries forming trochanteric and cruciate anastomoses and describe their importance. Discuss superficial and deep venous drainage of the lower limb. Define the importance of great saphenous vein in CABG. Discuss the anatomical basis of varicose veins. Define aneurysm. <p>Skills</p> <p><u>Surface marking</u></p> <ul style="list-style-type: none"> Mark the following vessels on a subject Ulnar and radial artery Cephalic and basilic vein Identify main arteries and veins supplying the upper and lower limb on a model. Examine pulses of upper and lower limb in a subject. 		
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PHYSIOLOGY

HEMATOLOGY AND IMMUNOLOGY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Hemopoiesis	Describe the Morphology and Genesis of blood cells	<ul style="list-style-type: none"> Differentiate between various types of blood cells on the basis of their morphological and physiological characteristics. Overview sites of hemopoiesis in the body during different stages of life along with composition and Functions of bone marrow. Identify the factors regulating erythropoiesis and maturation of RBC. Appreciate the composition of 	LGIS	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured viva

		<p>blood and general functions of blood.</p> <ul style="list-style-type: none"> • Explain different types of plasma proteins with their functional significance 		
Red Blood Cells Dyscrasias	Differentiate between various types of anemias and their clinical and lab presentation	<ul style="list-style-type: none"> • Relate the morphology and physiology of different types of hemoglobin • Compare and contrast different types of anemia on the basis of etiology, pathophysiology, clinical presentations and blood picture. • Describe etiology, pathophysiology and clinical presentation of polycythemia. 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva
WBCs & Immunity	Classify different types of immunity on the basis of cell types and their role in defense mechanism.	<ul style="list-style-type: none"> • Relate the morphology and physiology of different WBCs with clinical presentations of leucopenia, leukocytosis and leukemia. • Appraise the clinical significance of RES reticuloendothelial system. • Describe pathophysiology of inflammation and necrosis • Describe the physiological basis of vaccination. 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva
Hemostasis and Blood Coagulation	Compare and contrast various bleeding disorders.	<ul style="list-style-type: none"> • Identify role of cells and proteins involved in the process of maintaining hemostasis. • Differentiate between intrinsic and extrinsic regulations of blood coagulation • Discuss the morphology, etiology, pathophysiology and clinical presentation of thrombocytopenia, thrombocytosis and hemophilia 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva

Blood grouping and Transfusion reactions	Analyze transfusion reactions	<ul style="list-style-type: none"> • Explain the principles of blood grouping keeping in view their physiological significance. • Identify the various blood groups and hazards of matched and mismatched blood 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva
BIOCHEMISTRY				
Enzymes	Apply the basic concepts of enzymes in clinical diagnosis and therapeutic use	<ul style="list-style-type: none"> • Introduction, Definition, Classification • Mechanism of catalysis • Coenzymes, co-factors and their Biomedical role in human body • Km, Vmax-concept of Enzyme Kinetics and biomedical importance • Isoenzymes, their clinical importance • Factors affecting enzymes activity in the human body • Michaelis-Menten Equation and its biomedical importance (no derivation of equations) • Enzyme inhibitors and their classification and biomedical importance • Regulation of enzyme activity-overview • Application of enzymes in clinical diagnosis and therapeutic use 	<ul style="list-style-type: none"> • Lectures • SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva
Porphyryn and Haemoglobin	Correlate the biochemical basis of Porphyryn and Hemoglobin with clinical conditions	<ul style="list-style-type: none"> • Chemistry and biosynthesis of haemoglobin • Structure, functions and types of hemoglobin • Oxygen binding capacity of hemoglobin, factors affecting and regulating the oxygen binding capacity of hemoglobin • Degradation of heme, formation of Bile pigments, its types, transport and excretion 	<ul style="list-style-type: none"> • Lectures • SGD • PBL • CBL 	<ul style="list-style-type: none"> ▪ MCQ/ ▪ SAQ/SEQ

		<ul style="list-style-type: none"> • Hyperbilirubinemia, their biochemical causes and differentiation • Jaundice and its types • Hemoglobinopathies (HP-S, Thalassemia) and their biochemical causes 		
Practicals: Estimation of serum amylase with micro lab				
ORAL BIOLOGY				
Enamel	Relate the developmental and histo-morphological knowledge of enamel to different clinical scenarios	<ul style="list-style-type: none"> • Describe physical characteristics of enamel in terms of anatomical location, hardness, thickness, permeability, color, translucency and brittleness • Define the following terms/structure: rods, inter-rod, rod sheath, amelogenesis, aprismatic enamel, papillary layer, apoptosis, primary enamel cuticle, reduced enamel epithelium, nasmyth's membrane, neonatal line, striae of retzius, cross striation, perikymata, hunter schreger bands, dentinoenamel junction, enamel tufts, enamel lamellae, enamel spindles, gnarled enamel, pits, enamel caps, focal holes, enamel brochs, attrition, abrasion, erosion • Describe embryological origin (from germ layer) and functions of enamel • Enlist chemical composition of enamel including percentage of each content • Describe and identify key-hole/fish scale pattern of enamel 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<p>as seen in electron microscope (arrangement of rod, inter-rod and rod sheath) also draw and label</p> <ul style="list-style-type: none"> • Describe dimension, shape, function and growth of enamel crystallites (hydroxyapatite) • Describe number, course, orientation, dimension, constituents and significance of enamel rods in primary and permanent teeth • Enumerate different morphological and functional phases/stages which an ameloblast passes through during amelogenesis • Identify, draw and label ameloblast in different stages of amelogenesis • Explain morphogenetic, histodifferentiation and secretory phases of amelogenesis in terms of function, presence/absence of basal lamina, shape, size and arrangement of cells, location and shape of nucleus, presence/absence of mitotic activity and location of junctional complexes • Explain formation and location of Tome's process and its role in enamel mineralization during secretory phase of amelogenesis • Describe location, formation and function of prismatic and aprismatic enamel • Classify enamel proteins according to their function during amelogenesis • Describe cell shape, size and volume, protein secreting activity, apoptosis, basal lamina formation seen in ameloblasts 		
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		<p>during Transition phase of amelogenesis</p> <ul style="list-style-type: none"> • Explain the modulation cycle seen during maturation phase of amelogenesis in terms of significance, changes in morphology and function of ameloblasts, and permeability of junctional complexes • Describe process of hydroxyapatite crystal growth and organic content degradation and removal during maturation proper of amelogenesis • Describe morphological changes in ameloblasts, during post maturation phase of amelogenesis • Discuss incremental growth lines in enamel in terms of daily/weekly growth in μm, significance, direction and causes • Explain cause of formation, location and significance of neonatal line in primary and permanent teeth • Describe location, cause, course, histological appearance and number (per μm occlusally and cervically) of Perikymata in enamel • Describe location, cause of formation, course and histological appearance of Hunter Schreger bands in enamel • Identify neonatal line in pictures/histological slides of ground section of enamel, Striae of Retzius, Perikymata and Hunter Schreger bands in images/pictures, draw and label • Describe histological appearance 		
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		<p>and significance of Dentinoenamel junction in longitudinal and cross section of a tooth</p> <ul style="list-style-type: none"> • Describe location, cause of formation, course, distance and content of Enamel Tufts. • Explain location, appearance, content and clinical significance of Enamel Lamellae • Discuss location, appearance, cause of formation, dimension, extension of Enamel Spindles • Identify, draw and label Enamel Lamellae, dentinoenamel junction, Enamel Tufts Enamel Spindles in pictures/images • Describe cause of formation, location and significance of Gnarled enamel • Describe size, location and histological appearance, cause of formation of pits, enamel caps, focal holes and enamel brochs • Discuss morphological, histological, environmental and functional changes which occur in enamel due to aging • Discuss flourosis, congenital syphilis, amelogenesis imperfecta and its types in terms of clinical presentation and affected stages of amelogenesis 		
Incisors	Demonstrate and compare anatomical structures of central and lateral incisors.	<ul style="list-style-type: none"> • Tabulate initiation of calcification, completion of enamel and root in terms of months/years • Discuss and identify, on models/images/teeth specimen, the general considerations including tooth surfaces, shape of mesial, distal, labial, lingual and incisal outlines, mesiodistal dimensions and contours, inclination of incisal margin, 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<p>shape of mesioincisal and disto-incisal line angles, shape and curvature of cervical margin, number and location of developmental depressions, location and boundaries of lingual fossa, location, shape and inclination of cingulum, location of imbrication lines, marginal ridges, height of contour, contact area</p> <ul style="list-style-type: none"> • Describe number, shape and inclination of root • Describe number, location and significance of pulp canals and pulp horns • Differentiate, on morphological basis, central and lateral incisor of the same and/or different arch • Draw and label incisors from labial, lingual, mesial, distal and incisal aspect • Carving of Maxillary central incisor according to natural tooth dimensions on wax block/soap 		
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BDS YEAR I
BLOCK I
MODULE IV
CVS
Duration: 05 weeks

Integration of Disciplines in Module IV

ANATOMY				
Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructional Strategy	Assessment Tool
	By the end of the module students will be able to:			
GENERAL ANATOMY				
Circulatory system	Summarize the general anatomical features of circulatory system	<ul style="list-style-type: none">Justify general plan of systemic, portal and lymphatic circulatory system.Compare blood vessels according to their size and functions with examples of each type.Describe various types of anastomoses with example and their clinical significance	LGIS/ SGD	<ul style="list-style-type: none">MCQSAQ/SEQStructured vivaOSPE
GROSS ANATOMY				
Heart and coronary circulation	Correlate anatomical knowledge of heart and coronary circulation with relevant clinical conditions	Knowledge <ul style="list-style-type: none">Describe anatomical position, borders, surfaces and external features of heart.Outline the main internal features of various chambers of heartDescribe the arterial supply, venous drainage and nerve supply of heart.Define dominance of heartDefine angina pectoris	LGIS/ SGD	<ul style="list-style-type: none">MCQSAQ/SEQStructured vivaOSPE

		<p>and myocardial infarction, and explain their anatomical basis in case of coronary artery disease.</p> <ul style="list-style-type: none"> • Explain anatomical basis of cardiac referred pain in case of ischemic heart disease • Define angioplasty, angiography <p>Skills</p> <ul style="list-style-type: none"> • Locate sites of auscultation of various heart sounds on chest wall of a subject • Identify features of heart on a model. 		
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PHYSIOLOGY

CVS

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Physiological anatomy of heart and cardiac action potential	Appreciate the functional characteristics of cardiac muscle, action potential and cardiac impulse	<ul style="list-style-type: none"> • Appreciate the physiological arrangement of right and left hearts along with the parallel arrangement of systemic circulation. • Recognize physiological anatomy of cardiac muscles, its functional syncytium and intercalated disc • Differentiate between cardiac, skeletal and smooth muscles based on macro-, microscopic and functional differences, action potentials. • Distinguish ionic changes in different phases of action 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva

		<p>potential within cardiac muscle</p> <ul style="list-style-type: none"> • Correlate the phases with ionic changes during pacemaker action potential in heart • Comprehend cardiac impulse transmission 		
Cardiac cycle	Compare and contrast the pressure and volume changes in different components of circulatory system during cardiac cycle	<ul style="list-style-type: none"> • Illustrate pressure and volume changes during various phases of cardiac cycle • Illustrate pressure-volume diagram of left heart • Comprehend preload and afterload, its influence on stroke volume (The Frank-Starling's mechanism) • Discuss the autonomic regulation of heart 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva
Control of Local Blood	Identify the dynamics of local and peripheral Blood flow	<ul style="list-style-type: none"> • Distinguish between acute and chronic control of local blood flow. • Conceptualize active and reactive hyperemia • Relate the blood flow control to total peripheral resistance 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva
Cardiac output and venous return	Analyze the factors regulating venous return and cardiac output at rest and during exercise.	<ul style="list-style-type: none"> • Understand the determinants of cardiac output and factors affecting cardiac output. • Appreciate the mechanics of low and high cardiac outputs along with their effects on heart. • Comprehend the factors affecting stroke volume, heart rate and total peripheral resistance. • List the functions of 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva

		veins <ul style="list-style-type: none"> • Identify factors regulating venous return and significance of venous reservoirs. • Appreciate the equality of cardiac output and venous return. 		
Arterial blood pressure	Summarize regulatory mechanisms of blood pressure & cardiac output control in health and disease	<ul style="list-style-type: none"> • Comprehend the determinants of arterial pressure, factors affecting and mechanisms regulating blood pressure on short- and long-term basis. • Recognize mean arterial pressure and its significance. • Comprehend the individual and integrative role of baroreceptors, chemoreceptor, volume receptors, arterial natriuretic factors and Renin-angiotensin - aldosterone system in regulation of arterial pressure. • Understand the characteristics of regional circulations (skeletal muscles, pulmonary, coronary & cerebral) and factors regulating thereof 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva
Circulatory shock	Compare various types of shock and their pathophysiology	<ul style="list-style-type: none"> • Discriminate various types of shock, its types and stages of development • Differentiate between compensated and uncompensated shock. • Recognize the short term and long-term 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva

		compensatory mechanisms in circulatory shock. <ul style="list-style-type: none"> • Diagnose and treat various types of shock based on clinical scenarios 		
ECG	Interpret normal ECG	<ul style="list-style-type: none"> • Comprehend basis of ECG, different ECG Leads and their placements • Draw and label normal ECG showing various waves, segments and intervals • Understand significance of waves, segments and intervals of ECG • Calculation of heart rate and various intervals and segments • Appreciate relationship between vector and lead, type and locations of leads and principles for vector analysis in a normal heart 	LGIS	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva

Practicals/SGDs:

1. Record Interpret normal ECG by placing all the chest and limb leads on an SP
2. Examine the Radial Pulse and comment on rate, rhythm and character.
3. Examine the Heart Sound on Pulmonary, Aortic, Mitral and Tricuspid areas

BIOCHEMISTRY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Lipid Chemistry & Metabolism	Relate the significance of different lipids in medicine	<ul style="list-style-type: none"> • Definition, biomedical function, Classification of lipids • Phospholipid chemistry & biochemical significance, • Glycolipids, 	Lectures SGD	<ul style="list-style-type: none"> ▪ MCQ ▪ SAQ/SEQ ▪ Structured viva

		<ul style="list-style-type: none"> • Sphingolipids and their biochemical Significance • Fatty acids, chemistry, classification and biochemical function, Essential fatty acids • Eicosanoids, their classification and functions in health and disease • Mobilization & transportation of Fatty Acids • Beta oxidation • Steroids, sterol e.g. cholesterol, their chemistry & functions and • clinical significance • Ketogenesis and Ketolysis. • Mechanism and utilization of Ketone bodies and significance • Overview of Lipoprotein Metabolism. • Discuss Cholesterol Synthesis (rate limiting step) • Discuss Hypercholesterolemia and atherosclerosis 		
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Practicals:

Lipid profile by microlab

ORAL BIOLOGY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Dentin	Apply developmental and	<ul style="list-style-type: none"> • Define dentin, predentin, mantle dentin, circumpulpal dentin, 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva

	<p>histomorphological knowledge of dentin to different clinical scenarios</p>	<p>primary dentin, secondary dentin, tertiary dentin, reactive dentin, reactionary dentin, dentinogenesis, osteodentin, von Korff's fibers, Hyaline layer, dentinal tubules, dead tracts, peritubular dentin, inter tubular dentin, inter globular dentin, granular layer of tomes, sclerotic dentin, contour lines of Owen, Lines of von Ebner</p> <ul style="list-style-type: none"> • Describe composition by weight and volume, physical properties, innervation, vascularity, permeability, functions and age changes of dentin • Describe formation, location, structure, thickness and function of predentin, primary, secondary and tertiary dentin. Also draw and label • Discuss process of dentinogenesis in terms of odontoblasts formation and differentiation, role of Hertwig's epithelial root sheath, organic matrix deposition and mineralization • Draw and label stages of dentinogenesis • Describe Globular and Linear Mineralization in terms of matrix vesicle formation and fusion • Tabulate the differences between coronal and 	<p>▪ OSPE</p>
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		<p>radicular dentin in terms of location, formation and orientation of dentinal tubules</p> <ul style="list-style-type: none"> • Identify in histological slides/pictures pre dentin, primary dentin, secondary dentin, tertiary dentin, dentinal tubule, intertubular dentin, peritubular dentin, interglobular dentin, Incremental lines, granular layer of tomes, sclerotic dentin, dead tracts • Discuss the dentinal tubules in terms of extension diameter, content and functions • Describe and identify location, appearance, cause and significance of interglobular dentin, sclerotic dentin, Granular layer of Tomes. Draw and label granular layer of Tomes • Describe different theories to explain the process of dentin sensitivity 		
Pulp	Relate the developmental and histo-morphological knowledge of pulp to different clinical scenarios	<ul style="list-style-type: none"> • Describe pulp in terms of location, content, developmental origin and function • Describe the names, location, content and function of four histological zones seen in dental pulp under microscope • Identify, draw and label four histological zones 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<p>of dental pulp as seen in images/slides.</p> <ul style="list-style-type: none"> • Enlist constituents of dental pulp in terms of cells and extracellular substances • Discuss origin, type, size, orientation, and location of collagen fibers in dental pulp • Identify, draw and label functional odontoblastic cell at higher magnification • Describe location, shape, number, arrangement, function and histological features of odontoblastic cells in a functional tooth • Differentiate active and resting odontoblastic cell in terms of histological features and functionality • Describe histological features, shape, location and functions of cells present in pulp (fibroblasts, undifferentiated mesenchymal cells, macrophages, dendritic cells, lymphocytes) • Describe the orientation, histology, size, type and functions of blood vessels and nerves (myelinated, unmyelinated) in dental pulp • Define and identify plexus of Rashkow in terms of histological appearance, location 		
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		<p>and function</p> <ul style="list-style-type: none"> • Discuss age related changes seen in dental pulp in terms of volume, content, vascularity, innervation, pathology • Describe types, formation, location, arrangement, appearance and clinical significance of pulp stones • Identify pulp stones in pictures/images 		
Bone	Relate the developmental and histo-morphological knowledge of bone to different clinical scenarios	<ul style="list-style-type: none"> • Define bone , alveolar bone, alveolar process, lamina dura, sharpey's fibres, bundle bone, Supporting bone, cortical bone, spongy bone, interdental bone, inter radicular bone, periosteum, endosteum, osteon, haversian canal, volkman's canal, circumferential lamellae, concentric lamellae, interstitial lamellae • Classify bone according to gross appearance and development • Discuss histology of compact and spongy bone in terms of formative and resorptive cells (osteoblasts, osteocytes, osteoclasts), lamellae, Haversian and volkman's canals • Describe histology and function of osteoblast, 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<p>osteocyte and osteoclasts</p> <ul style="list-style-type: none"> • Identify in histological slides/images compact and spongy bone and bone cells • Describe and identify histological changes and features of intramembranous and intracartilaginous ossification • Describe composition, function, regulation, remodeling (phases, normal turnover rate in cortical and trabecular bone, turnover rate in children /adults/old age) and age changes and repair and regeneration of bone • Draw and label compact bone histology 		
Periodontium	<p>Relate the developmental and histo-morphological knowledge of periodontium to different clinical scenarios</p>	<ul style="list-style-type: none"> • Define and enumerate the components of periodontium • Define cementum, periodontal ligament, gingiva, cementoenamel junction, Sharpey's fibers, cementoid, cementodentinal junction, hypercementosis, ankylosis, cementicles, lamina dura, bundle bone • Describe physical properties of cementum in terms of hardness, location, thickness, function, vascularity, innervation, types, formative cells and permeability 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<ul style="list-style-type: none"> • Identify cementum in images/slides of ground section of tooth • Discuss chemical composition of cementum in %age (inorganic and organic including names of cells, types of collagen fibers and non collagenous proteins) • Classify cementum in terms of presence or absence of cells, origin of collagen fibers (extrinsic and intrinsic) and combination of both • Identify in histological pictures/slides also draw and label the different types of cementum • Describe the four cementum types (primary, secondary, mixed and acellular) in terms of cells, origin of fibers, location, function, formation/development mineralization • Differentiate intrinsic and extrinsic collagen fibers in terms of formation, location, histology and dimension • Classify cemento enamel junction in terms of enamel and cementum overlapping also discuss clinical significance • Describe histological appearance and significance of cementodentinal 		
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		<p>junction</p> <ul style="list-style-type: none"> • Discuss age related changes occurring in cementum in terms of appearance, thickness, cementicles and repair process • Describe periodontal ligament development, location, average width, content (names of cells, types of collagen fibers, elastic and reticular fibers, ground substance) function, remodeling and age changes • Enumerate the five principal fiber bundles of periodontal ligament • Identify in images/histological slides, draw and label, and also describe the location, direction/orientation, origin, insertion and function of principal fibers of periodontal ligament • Describe blood supply of periodontal ligament in terms of names of blood vessels, branching pattern, routes, plexus, location, diameter, difference in vascularity of anterior vs posterior teeth, mandible vs maxillary teeth. • Discuss nerve supply of periodontal ligament in terms of names of nerves, types of nerve fibers, location and branching 		
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		<ul style="list-style-type: none"> • Discuss names, location, histological appearance and function of nerve endings present in periodontal ligament • Discuss histological changes seen in supporting system of tooth in increased or decreased function load • Define Attached gingiva, free gingiva, gingival sulcus, junctional epithelium, sulcular epithelium, dentogingival junction, Col • Identify in images/patients gingiva, free gingiva, attached gingiva, col, interdental gingiva • Identify in images/histological slides, draw and label, and also describe the location, direction/orientation, origin, insertion and function of principal fibers of gingival ligament 		
Neurovascular supply of mouth	Relate the neurovascular supply of orofacial region to various clinical scenarios	<ul style="list-style-type: none"> • Identify the nerves and vessels supplying orofacial structures • Relate the neurovascular supply with clinical scenarios 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE
Canines	Demonstrate basic anatomy and anomalies of canines and differentiate it from the rest of the	<ul style="list-style-type: none"> • Tabulate initiation of calcification, completion of enamel and root in terms of months/years • Describe and identify, 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

	dentition	<p>on models/images/teeth specimen, the general considerations including tooth surfaces, shape of mesial, distal, labial, lingual and incisal outlines, mesiodistal dimensions and contours, length and inclination of mesioincisal and distoincisal slope, shape and curvature of cervical margin, location, and extent of lingual and buccal ridges, number and location of developmental depressions, location and boundaries of lingual fossae, location shape and inclination of cingulum, marginal ridges, height of contour, contact area</p> <ul style="list-style-type: none"> • Describe number, shape, inclination and variation of root • Describe number, location and significance of pulp canals and pulp horns • Differentiate, on morphological basis, mandibular and maxillary canine, canine and incisors • Draw and label canines from labial, lingual, mesial, distal and occlusal aspect 		
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BDS YEAR I
BLOCK II
MODULE V
RESPIRATORY SYSTEM
Duration: 02 weeks

ANATOMY				
Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructional Strategy	Assessment Tool
	By the end of the module students will be able to:			
GROSS ANATOMY				
Thorax	Appraise the gross	<ul style="list-style-type: none">Describe the formation of thoracic apertures.Trace the course of vagus nerve in thorax SkillIdentify cardiophrenic angle, hilar shadow and aortic knuckle on chest x ray.	<ul style="list-style-type: none">LecturesSGD	<ul style="list-style-type: none">MCQ/ SEQVivaOSPE
	Correlate structural with clinical anatomy of diaphragm.	<ul style="list-style-type: none">Identify parts of diaphragmList the apertures in diaphragm with their levels and structures passing through eachAnalyze presentation of phrenic nerve lesions with anatomical reasoningJustify anatomical basis of referred shoulder tip pain	<ul style="list-style-type: none">LecturesSGD	<ul style="list-style-type: none">MCQ/ SEQVivaOSPE
Mediastinum	Recognize divisions of mediastinum and their relations of clinical relevance	<ul style="list-style-type: none">Define mediastinum.Enumerate the divisions of mediastinum.Enlist the structures contained in different mediastina.		
Lungs	Appraise the anatomy of lungs and relevant clinical conditions	<ul style="list-style-type: none">Identify the borders, surfaces, and hilar apertures.		
PHYSIOLOGY				

RESPIRATORY AND HIGH ALTITUDE

Topic	Learning Outcomes	Learning Objectives/Contents	Instructional Strategies	Assessment tools
Introduction to Respiratory System	<ul style="list-style-type: none"> Correlate the anatomy of respiratory tract with its functions Appreciate the role of conductive and gas exchange zones of lungs 	<ul style="list-style-type: none"> Recognize the functional anatomy of various parts of respiratory system Highlight the non-respiratory functions of respiratory tract 	LGIS	MCQ/SAQ/structured viva
Pulmonary Mechanics	<ul style="list-style-type: none"> Analyze the mechanics of respiration Analyze lung volume and pressure changes during quiet and forceful breathing 	<ul style="list-style-type: none"> Distinguish functions of inspiratory and expiratory muscles during quiet and forceful respiration Correlate normal lung volumes/ capacities to various pressures and volume changes during forceful respiration and changes in volume and capacities 	LGIS	MCQ/SAQ/structured viva
Pulmonary Compliance	Explain factors determining pulmonary compliance	<ul style="list-style-type: none"> Discern lung and chest wall compliance Identify composition & role of surfactant in alveolar surface tension State concept of work of breathing 	LGIS	MCQ/SAQ/structured viva
Respiratory Membrane & Diffusion of Gases	Compare the different modes of gas transport in blood	<ul style="list-style-type: none"> Appreciate the layers of respiratory membrane in detail Appraise concept of diffusing capacity through respiratory membrane Identify factors affecting gas diffusion through respiratory membrane 	LGIS	MCQ/SAQ/structured viva

Diffusion of gases & Oxygen transport		<ul style="list-style-type: none"> State the mechanics of oxygen diffusion from alveoli to blood Distinguish mechanism of oxygen transport in the arterial blood, tissue fluid and cell 	LGIS	MCQ/SAQ/structured viva
Oxygen transport & Dissociative curve		<ul style="list-style-type: none"> Identify the role of Hb in oxygen transport Analyze normal oxygen-hemoglobin dissociation curve by explaining factors that shift oxygen-hemoglobin dissociation curve to right and left 	LGIS	MCQ/SAQ/structured viva
Carbon dioxide transport		<ul style="list-style-type: none"> Identify various chemical form in which CO₂ is transported in blood Discern normal CO₂ dissociation curve explaining Bohr effect, haldane effect and chloride shift 	LGIS	MCQ/SAQ/structured viva
Hypoxia and cynosis		<ul style="list-style-type: none"> Differentiate between hypoxia and cyanosis Explain types of hypoxia and cyanosis Describe manifestations of hypoxia and cynosis 	LGIS	MCQ/SAQ/structured viva
Nervous regulation of respiration	<ul style="list-style-type: none"> Compare the chemical and neural regulation of respiration during rest and exercise Correlate ventilation with perfusion in different lung zones 	<ul style="list-style-type: none"> State different group of neurons composing respiratory center Review nervous control of inspiration and respiratory rhythm Recognize the regulatory mechanism of hering-breuer inflation reflex 	LGIS	MCQ/SAQ/structured viva
Chemical regulation of respiration		<ul style="list-style-type: none"> Appraise location, function and stimulation (by CO₂ and H⁺) of central chemosensitive area 	LGIS	MCQ/SAQ/structured viva

		<ul style="list-style-type: none"> Identify the role of peripheral chemoreceptors for control of respiration Determine the composite effects of PCO₂, pH, & PO₂ on alveolar ventilation 		
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Practicals/SGDs:

1. Determination of Platelet count
2. Determination of Haemoglobin in the blood. (Sahili's method)
3. Determine Red cell indices

BIOCHEMISTRY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Biochemistry of body fluids	Demonstrate understanding of biochemistry of body fluids	<ul style="list-style-type: none"> Ionization of water and weak acids and bases Concept of pH and pH scale Dissociation constant & titration curve of weak acids, the concept of pK values Buffers, their mechanism of action Henderson-Hasselbalch Equation (No derivation) Distribution of body fluid Water turn over and balance Biomedical Importance of - Osmosis, Osmotic pressure, surface tension, viscosity & their importance related to body fluids 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured viva

Practicals:

Preparations of Solutions

ORAL BIOLOGY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Speech	Correlate the anatomical knowledge for understanding process of speech	<ul style="list-style-type: none"> Describe basic events of speech production (initiation, phonation, articulation) and its neurological control by higher centers 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ Viva OSPE
Maxillary sinus	Relate the developmental and anatomical aspects of maxillary sinus with various clinical scenarios	<ul style="list-style-type: none"> Describe location and anatomy of maxillary sinus Describe development and growth of maxillary sinus Apply anatomical and developmental aspects of maxillary sinus in clinical scenarios 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ Viva OSPE
Maxillary premolars	Differentiate between maxillary and mandibular premolars	<ul style="list-style-type: none"> Tabulate initiation of calcification, completion of enamel and root in terms of months/years Describe and identify, on models/images/teeth specimen, tooth surfaces, shape of mesial, distal, buccal, lingual/palatal and occlusal outlines, mesiodistal dimensions and contours, shape and curvature of cervical margin, boundaries of occlusal table; number, 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ Viva OSPE

		<p>location, size, variation (U, H and Y type occlusal morphology in case of mandibular 2nd premolar) of cusps, name, number and location of pits, grooves and fossae, boundaries of fossae, location, size, variations of marginal ridges, height of contour, contact area, mesial concavity, developmental depressions, location and formation of transverse ridge, location and names of cusp ridges and inclined planes,</p> <ul style="list-style-type: none"> ▪ Describe number, shape, inclination and variations of root/roots ▪ Describe number, location and significance of pulp canals and pulp horns ▪ Differentiate, on morphological basis, mandibular and maxillary premolars ▪ Draw and label premolars from buccal, lingual/palatal, mesial, distal and occlusal aspect 		
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BDS YEAR I
BLOCK II
MODULE VI
ENDOCRINOLOGY & METABOLISM
Duration: 04 weeks

ANATOMY				
Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructional Strategy	Assessment Tool
	By the end of the module students will be able to:			
GENERAL EMBRYOLOGY				
Development of skull	Comprehend the embryological basis behind the development of skull, correlate them with various relevant clinical presentations	<ul style="list-style-type: none">Identify the sources of skullClassify Skull on embryological basisDescribe the events in development of cartilaginous and membranous neurocranium and viscerocraniumOutline features of a newborn skull. Identify the fontanelles with reference to their location, closing time and clinical significanceExplain the embryological basis of microcephaly and various types of craniosynostosis	<ul style="list-style-type: none">LecturesSGD	<ul style="list-style-type: none">MCQ/ SEQVivaOSPE
Gross (Head)				
Skull	Elucidate the topographic anatomy of skull	<ul style="list-style-type: none">Appreciate the general plan of studying skull from different views.Identify important bony landmarks on the bones as viewed from lateral, superior, inferior, anterior and posterior views.List structures traversing the foramina in these bonesIdentify the bones forming the boundaries		

		of orbit, nasal cavity. oral cavity, temporal, infratemporal fossa & pterygopalatine fossa on the given bone. (detail to be done with relevant topics)		
Scalp	Correlate the structure and neurovascular supply of scalp with anatomical basis of relevant clinical conditions.	Appraise extent of scalp on model Enumerate layers of scalp in a sequential order Correlate gross features of each layer with anatomical basis of black eye, profuse bleeding, gaping wound, spread of scalp infection and shape of hematoma		
Temporal & infratemporal region	Correlate the location, boundaries, and contents of temporal and Infratemporal fossa with relevant clinical conditions	<ul style="list-style-type: none"> • Identify the location, boundaries, contents and communications of temporal and infratemporal fossa on a given model and skull. • Describe the course and distribution of mandibular nerve from origin to distribution • Tabulate the attachments, actions and nerve supply of muscles of mastication. • Trace location, various routes and distribution of otic ganglion • Justify role of lateral pterygoid as a peripheral heart on anatomical basis of pterygoid venous plexus • Elucidate importance of pterygoid venous plexus in case of intracranial spread of infection to cavernous sinus. • Trace origin and distribution of superficial temporal, first and 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE

		second parts of maxillary artery		
Pterygopalatine fossa	Describe the anatomy of Pterygopalatine fossa in relation with surrounding structures	<ul style="list-style-type: none"> • Identify the location of pterygopalatine fossa on skull • Enumerate the contents and communications • Describe the distribution of third part of maxillary artery, nerve and pterygopalatine ganglion • Justify the role of pterygopalatine ganglion in hay fever/allergies 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE
Nose and paranasal sinuses	Correlate the gross anatomy of Nose and paranasal sinuses with relevant clinical conditions	<ul style="list-style-type: none"> • Describe the skeletal framework of different walls of nose • Describe the features, vascular supply, nerve supply and openings in lateral wall of nose • Describe the features, vascular supply, nerve supply of medial wall of nose • Highlight the significance of little's area in a case of epistaxis • Trace the location and drainage of paranasal sinuses in skull and on radiograph 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE
Hard and soft Palate	Correlate the gross anatomy of hard and soft palate with their relevant clinical conditions	<ul style="list-style-type: none"> • Discuss the bony framework of hard palate. • Identify the gross features of hard palate and soft palate. • Identify muscles of soft palate on the model • Describe the 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE

		attachments, nerve supply and actions of muscles of soft palate • Describe blood supply and nerve supply of soft palate • Identify the main muscles forming the palatoglossal and palatopharyngeal Arches		
Mandible	Elucidate the topographic anatomy of mandible	• Identify parts of mandible • Describe ramus and body of mandible with respect to its bony features and attachments.	▪ Lectures ▪ SGD	▪ MCQ/SEQ ▪ Viva ▪ OSPE
Submandibular region	Correlate the anatomy of Submandibular region with its clinical significance	• Revisit boundaries of submandibular triangle • Describe the parts, relations, neurovascular of submandibular gland. • Trace the routes of submandibular ganglion • Describe the distribution of submandibular ganglion • Correlate the anatomy of submandibular fascial space with Ludwig's angina	▪ Lectures ▪ SGD	▪ MCQ/SEQ ▪ Viva ▪ OSPE
TMJ	Correlate the Gross anatomical features of temporo-mandibular joint with clinical significance	• Identify the type of TMJ. • Identify the articular surfaces of TMJ on a given model or dry bones. • Explain the attachments of capsule. • Name the ligaments of TMJ. • Describe the attachments and relations of ligaments of TMJ.	▪ Lectures ▪ SGD	▪ MCQ/SEQ ▪ Viva ▪ OSPE

		<ul style="list-style-type: none"> • Describe the type and shape of articular disc. • Justify the presence of two joint cavities and types of movements occurring in each. • Describe the movements of jaw at TMJ with special reference to axis and muscles producing them. • Describe the clinical signs of anterior dislocation of TMJ and explain the steps of its reduction. 		
Oral cavity	Correlate the gross anatomy of oral cavity and tongue with anatomical basis of relevant clinical conditions	<ul style="list-style-type: none"> • Name different boundaries of oral cavity. • Describe blood and nerve supply and lymphatic drainage of oral cavity. • Identify the location of inferior alveolar nerve block • Describe the salient features of floor of mouth. • Discuss the attachments, actions, nerve supply and relations of suprahyoid muscles • Identify parts of tongue • Identify the gross features of dorsal and ventral surfaces of tongue • Name the intrinsic and extrinsic muscles of tongue. • Describe attachments, actions and nerve 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE

		supply of muscles of tongue • Describe the motor, general and special sensory innervation of tongue		
Pharynx	Correlate the gross anatomy of pharynx with relevant clinical conditions	• Differentiate extent, anatomical features, vascular supply, nerve supply of three parts of pharynx on anatomical basis • List muscles of pharynx	▪ Lectures ▪ SGD	▪ MCQ/SEQ ▪ Viva ▪ OSPE
PHYSIOLOGY				
ENDOCRINOLOGY				
Module/ Topics	Learning Outcomes	Learning Objectives/Contents	Instructional Strategies	Assessment tools
Basics of endocrinology & Mechanism of action of hormones	Appraise the mechanisms of action of hormones	• Identify the various hormone receptors and their activation • Explain the mechanism of intracellular signaling after hormone receptor activation • Explain the second messenger mechanisms for mediating intracellular hormonal functions • Identify the hormones that act mainly on the genetic machinery of the cell	LGIS	MCQ/SAQ/SEQ/ structured Viva
Hormones of hypothalamus and Pituitary gland		• Explain the pituitary gland and its relation to the hypothalamus • Summarize the hypothalamic-hypophyseal portal blood vessels of the anterior pituitary gland and its significance	LGIS	MCQ/SAQ/SEQ/ structured Viva
		• Recall the functions and regulation of growth hormone • Differentiate between hypopituitarism and hyperpituitarism and its pathophysiological basis	LGIS	MCQ/SAQ/SEQ/ structured Viva

		<ul style="list-style-type: none"> • Explain the posterior pituitary gland and its relation to the hypothalamus • Describe the physiological functions of ADH and oxytocin Hormone 		
Thyroid gland		<ul style="list-style-type: none"> • Recall the synthesis and secretion of the thyroid hormone • Explain the functions of the thyroid hormone • Summarize the regulation of thyroid hormone secretion • Identify the disorders of the Thyroid gland and their pathophysiological basis 	LGIS	MCQ/SAQ/SE Q/ structured Viva
Calcium regulating hormones		<ul style="list-style-type: none"> • Explain the regulation of calcium and phosphate in the extracellular fluid and plasma • Enlist the actions of vitamin D • Explain the effect of parathyroid hormone on calcium and phosphate concentrations in the extracellular fluid • Summarize the control of parathyroid secretion by calcium ion concentration • Describe the actions of calcitonin • Explain the pathophysiology of parathyroid hormone, vitamin D, and bone diseases 	LGIS	MCQ/SAQ/SE Q/ structured Viva
Hormones of adrenal cortex	Appraise the mechanisms of action of hormones	<ul style="list-style-type: none"> • Explain synthesis and secretion of adrenocortical hormones • Enlist the functions of aldosterone • Enlist functions of the glucocorticoids • Describe the disorders of adrenocortical secretion and their pathophysiological basis 	LGIS	MCQ/SAQ/SE Q/ structured Viva

Pancreas	Give pathophysiological basis of glucose regulation	• Explain glucose metabolism with its regulation	LGIS	MCQ/SAQ/SEQ/ structured Viva
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Practicals/SGDs:

1. Estimate haematocrit (PCV)
2. Estimate ESR by Westergren method
3. Determine ABO Rh blood groups.

BIOCHEMISTRY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Carbohydrate Chemistry & Metabolism	Relate the significance of different carbohydrates in medicine	<ul style="list-style-type: none"> • Definition, biochemical functions and classification • The biomedical importance of carbohydrates • Structure and functions of Monosaccharides, and their derivatives • Disaccharides - their important examples • Oligosaccharides-their combination with other macromolecules • Polysaccharides- their important examples and biochemical role • Overview (Introduction & biomedical importance) of major Metabolic pathways (Glycolysis, TCA cycle, Gluconeogenesis Glycogen metabolism, HMP shunt) and hormonal regulation 	Lectures SGD	MCQ SAQ/SEQ Structured viva

		(Insulin, Glucagon) <ul style="list-style-type: none"> • Glycolysis (Phases and reactions of Glycolysis) & Energetics of Aerobic and Anaerobic glycolysis • The fate of Pyruvate • The Citric Acid Cycle Reactions, energetics of Citric acid cycle • Gluconeogenesis Important three by-pass reactions • G6PD Deficiency • Pyruvate Kinase deficiency 		
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Practicals:

Molish's test

Saliwanoff s test and Rapid furfural test

Benedict s qualitative test

Fehling's Test

Iodine Test

Estimation of blood glucose by micro lab

ORAL BIOLOGY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment Tool
Oral mucosa	Relate the basic knowledge of oral mucosa to different clinical scenarios	<ul style="list-style-type: none"> ▪ Define oral mucosa, vermillion border, vermillion zone, vestibule, mucogingival junction, mucocutaneous junction, submucosa ▪ Describe boundaries, appearance, texture, 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<p>histology, functions, age changes, blood supply and nerve supply of oral mucosa</p> <ul style="list-style-type: none"> ▪ Classify and identify (in images/pictures/slides) oral mucosa according to location and function (masticatory mucosa, lining mucosa, specialized mucosa) ▪ Describe histological features of lamina propria (papillary layer, reticular layers, cells, fibers, ground substance, blood vessels, nerves) ▪ Tabulate histological differences between keratinized and non-keratinized oral epithelium in terms of name of cell layers, cell shapes, nucleus size and location ▪ Identify in histological pictures/images keratinized and non-keratinized epithelium ▪ Discuss location, shape, covering epithelium and function of tongue papillae (fungiform, filiform, circumvallate papillae) ▪ Identify tongue papillae in histological slides/images ▪ Discuss and identify histological features (shape, size, type of 		
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		<p>cells), location and function of taste bud</p> <ul style="list-style-type: none"> ▪ Define Fordyce spot, linea alba, Odland body, keratohyaline granules, orthokeratinization, parakeratinization, acanthosis, acantholysis, hyperkeratosis, keratinocyte, melanosomes, melanophage ▪ Identify Fordyce's granules in pictures/images ▪ Describe location, shape, size and significance of Odland bodies/membrane coating granules/lamellar bodies in keratinized and non-keratinized epithelium ▪ Describe location, shape, size of keratohyaline granules in keratinized and non-keratinized epithelium ▪ Describe and identify histological features and functions of non-keratinocyte in oral epithelium (melanocytes, langerhans, merkel, inflammatory cells) in terms of shape of cell, origin and location ▪ Describe exogenous and endogenous pigmentation in oral cavity with 		
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		<p>examples (Amalgam tattoo, Burton line)</p> <ul style="list-style-type: none"> ▪ Identify on patients/images junctions in oral cavity (mucogingival, dentogingival, mucocutaneous) ▪ Draw and label histology of taste bud 		
Mandibular premolars	Compare morphological aspects of premolars	<ul style="list-style-type: none"> ▪ Tabulate initiation of calcification, completion of enamel and root in terms of months/years ▪ Describe and identify, on models/images/teeth specimen, tooth surfaces, shape of mesial, distal, buccal, lingual/palatal and occlusal outlines, mesiodistal dimensions and contours, shape and curvature of cervical margin, boundaries of occlusal table; number, location, size, variation (U, H and Y type occlusal morphology in case of mandibular 2nd premolar) of cusps, name, number and location of pits, grooves and fossae, boundaries of fossae, location, size, variations of marginal ridges, height of contour, contact area, mesial concavity, developmental depressions, location 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<p>and formation of transverse ridge, location and names of cusp ridges and inclined planes,</p> <ul style="list-style-type: none"> ▪ Describe number, shape, inclination and variations of root/roots ▪ Describe number, location and significance of pulp canals and pulp horns ▪ Differentiate, on morphological basis, mandibular and maxillary premolars ▪ Draw and label premolars from buccal, lingual/palatal, mesial, distal and occlusal aspect 		
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BDS YEAR I
BLOCK II
MODULE VII
CRANIOFACIAL
Duration: 04 weeks

ANATOMY

ANATOMY				
Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructional Strategy	Assessment Tool
	By the end of the module students will be able to:			
Gross Anatomy (Neck)				
Cervical vertebrae		<ul style="list-style-type: none">• Differentiate typical and atypical cervical vertebrae Give distinguishing features of each cervical vertebra.• Enumerate structures passing through foramina• Outline ligamentous attachments on cervical vertebrae	<ul style="list-style-type: none">▪ Lectures▪ SGD	<ul style="list-style-type: none">▪ MCQ/ SEQ▪ Viva▪ OSPE
Joints of neck	Correlate the gross anatomical features of joints of neck with their clinical significance	<ul style="list-style-type: none">• Name the typical and atypical intervertebral joints of neck.• Identify the types of atlanto- occipital and atlanto-axial joints.• Describe the movements of these joints with muscles producing them	<ul style="list-style-type: none">▪ Lectures▪ SGD	<ul style="list-style-type: none">▪ MCQ/ SEQ▪ Viva▪ OSPE
Face	Correlate the gross anatomy of face with anatomical basis of relevant clinical conditions	<ul style="list-style-type: none">• Outline the characteristic features of facial skin.• Elucidate the cutaneous innervation of face• Group facial muscles according to the orifices they are guarding	<ul style="list-style-type: none">▪ Lectures▪ SGD	<ul style="list-style-type: none">▪ MCQ/ SEQ▪ Viva▪ OSPE

		<ul style="list-style-type: none"> Describe the nerve supply of muscles of facial expressions. Describe the course of arteries, veins, lymphatics and nerves of the face with the help of model. Correlate gross features of face with anatomical basis of danger area, trigeminal neuralgia, Bell's palsy. <p>Skills</p> <ul style="list-style-type: none"> Identify muscles of facial expressions Illustrate the cutaneous innervation of face 		
Mandibular and maxillary branches of Trigeminal nerve	Correlate the anatomy of mandibular and maxillary divisions of Trigeminal nerve with their lesions	<ul style="list-style-type: none"> Describe the pathway of mandibular nerve from nucleus to target organs Describe the pathway of maxillary nerve from nucleus to target organs. Describe the lesion of nerves with special reference to infections of molar teeth. 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ/SEQ Viva OSPE
Facial nerve	Correlate the anatomy of facial nerve with its lesions	<ul style="list-style-type: none"> Revisit the course and distribution of facial nerve Revisit the relationship of facial nerve with pterygopalatine and submandibular ganglia Revisit the effects of lesion of facial nerve at 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ/SEQ Viva OSPE

		<p>different levels</p> <ul style="list-style-type: none"> • Differentiate anatomical basis of clinical presentation of UMN and LMN lesion of facial nerve. 		
Parotid region	Correlate the anatomy of parotid region with its clinical significance	<ul style="list-style-type: none"> • Trace the pathway of autonomic supply of parotid gland. • Enumerate structures embedded in parotid gland in a sequential order. • Analyze anatomical basis of clinical presentation of mumps. • Correlate the extra cranial course of facial nerve with Bell's palsy. 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE
Deep cervical Fascia	<ul style="list-style-type: none"> • Anatomize the four layers of deep cervical fascia in detail. • Correlate the topography of cervical fascial spaces to mediastinal and contralateral spread of infection. 	<ul style="list-style-type: none"> • Enumerate the layers of deep cervical fascia. • Trace the attachments of investing, pre-tracheal, carotid sheath and prevertebral layers of fascia. • Identify various modifications and neck spaces formed by fascial attachments. • Comprehend the clinical importance of neck spaces in spread of infection 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE
Prevertebral region and root of the neck	Describe skin, superficial fascia, and cutaneous nerves of the prevertebral region along with the action and nerve supply of muscles present here	<ul style="list-style-type: none"> • Enumerate the prevertebral muscles • Describe origin, insertion, action and nerve supply of prevertebral muscles • Identify the boundaries of pyramidal space. • Describe the peculiar arrangement of prevertebral fascia in 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE

		<p>prevertebral region and justify formation of axillary sheath around axillary artery and brachial plexus but not axillary vein.</p> <ul style="list-style-type: none"> Anatomize the relations of key muscle of root of neck (scalenus anterior) Describe the parts and branches of subclavian artery. 		
Back of the neck	Link the anatomical location and contents of triangles present at the back of neck with their clinical significance	<ul style="list-style-type: none"> Enumerate the muscles of back of neck. Identify the boundaries and contents of suboccipital triangle. Describe the course and relations of 3rd and 4th parts of vertebral arteries. 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ/SEQ Viva OSPE
Muscles of the neck	Describe the origin, insertion, movements, and nerve supply of the muscles present in neck	<ul style="list-style-type: none"> Describe the muscles of neck (sternocleidomastoid, trapezius and infrahyoid muscles) along with their nerve supply with the help of models. Enlist the features of Torticollis 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ/SEQ Viva OSPE
Triangles of neck	Link the anatomical location of triangles of neck and their contents with their clinical significance	<ul style="list-style-type: none"> Tabulate the attachments, nerve supply, actions of superficial and deep muscles of neck (sternocleidomastoid, suprahyoid, infrahyoid, sub occipital, prevertebral muscles,). Identify boundaries and contents of triangles of neck on model Describe the origin, course and distribution 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ/SEQ Viva OSPE

		of nerves of neck (cervical plexus, Ansa cervicalis, Common carotid artery, Internal jugular vein, subclavian vessels)		
Vessels of neck	Correlate the anatomy of each vessel with its area of supply and drainage	<ul style="list-style-type: none"> Enumerate the main vessels in neck. Describe the course and branches of <ul style="list-style-type: none"> -External carotid artery -Subclavian artery -External jugular vein -Internal jugular vein 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ/SEQ Viva OSPE
Nerves of neck	Correlate the anatomy and distribution of cranial nerves with lesions associated with their injuries	<ul style="list-style-type: none"> Enumerate the main cranial nerves supplying in neck Trace the distribution of cranial nerves Enumerate branches of each of the above nerve and identify their area of supply. 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ/SEQ Viva OSPE
Viscera of neck	Correlate the anatomy of viscera's present in neck with their relevant clinical significance	<ul style="list-style-type: none"> Appraise the relations of trachea and esophagus in neck region with the help of dissection Describe the structures involved in cricothyroidotomy and Tracheostomy with the help of dissection 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ/SEQ Viva OSPE
Thyroid and parathyroid	Correlate the gross anatomy of thyroid and parathyroid glands with relevant clinical conditions	<ul style="list-style-type: none"> Identify gross features of thyroid and parathyroid glands on models. Describe capsule, relations and blood supply of thyroid and parathyroid gland Justify anatomical basis of movement of thyroid gland during deglutition 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ/SEQ Viva OSPE

		<ul style="list-style-type: none"> • Discuss surgical precautions in thyroid surgery while ligating vessels and enucleation 		
Larynx	Correlate the gross anatomy of larynx with relevant clinical conditions	<ul style="list-style-type: none"> • Describe laryngeal wall in detail with emphasis on cartilages, ligaments, muscles, vascular supply and nerve supply. • Analyze mechanism of abduction and adduction of vocal cords • Distinguish clinical presentations of injury to external, internal and recurrent laryngeal nerves 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE
Lymphatic drainage of the head and neck	Appraise the lymphatic drainage of neck with understanding of relevant clinical conditions on anatomical basis	<ul style="list-style-type: none"> • Enlist the groups of lymph nodes of neck. • Describe their location and areas of drainage • Appraise the formation of jugular lymph trunk • Correlate the clinical importance of lymphatic drainage of head and neck 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE
Orbit	Correlate the anatomy of orbital contents with relevant clinical significance	<ul style="list-style-type: none"> • Describe the skeletal framework of bony orbit and its communications • List the contents of orbit • Identify the parts of eyeball on a model • Tabulate the attachments, nerve supply and actions of extraocular muscles • Justify the movements of extraocular muscles based on their attachments • Trace the course and 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE

		<p>distribution of III, IV and VI Cranial Nerves</p> <ul style="list-style-type: none"> • Justify the peculiar Position of eyeball in case of lesion of III, IV and VI Cranial Nerves • Trace the route and distribution of ciliary ganglion. • Describe the course and distribution of ophthalmic nerve • Describe the nerve supply of Lacrimal gland 		
Lacrimal apparatus	Correlate the anatomy of lacrimal apparatus with relevant clinical significance	<ul style="list-style-type: none"> • Enumerate the structures forming lacrimal apparatus • Describe the nerve supply of lacrimal apparatus • Correlate the anatomical structures of lacrimal apparatus with the features of blocked Lacrimal duct 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE
Ear	Correlate the gross anatomy of ear with relevant clinical conditions	<ul style="list-style-type: none"> • Describe the gross anatomical features, boundaries, structures and contents of middle ear cavity. • Describe the structures forming the walls of middle ear cavity on the given model. • Highlight the importance of infection in middle ear cavity in relation to its communications. • Trace the pathway and distribution of facial nerve within petrous part of temporal bone. 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE

PHYSIOLOGY

Craniofacial (Special Senses)

Module/ Topics	Learning Outcomes	Learning Objectives/Contents	Instructional Strategies	Assessment tools
Physiology of Eye	Explain the physiology of optical system of eye and understand errors of refraction	Explain refraction and concept of convergence and divergence.	LGIS • CBL • Practical demonstration and performance	MCQ/SAQ/SEQ/ structured Viva/OSPE
		Define focal length, focal point and power of lens.		
		Differentiate between emmetropia, myopia, hyperopia, astigmatism, presbyopia and describe their treatment		
	Correlate physiological anatomy of retina with its neural functions	<ul style="list-style-type: none"> • Explain physiological anatomy of retina • Discuss photochemistry of vision • Explain visual pathways and accommodation reflex pathways 	LGIS • CBL • Practical demonstration and performance	MCQ/SAQ/SEQ/ structured Viva/OSPE
Physiology of Ear	Explain the physiology middle ear	Describe the physiological Anatomy of ear	LGIS	MCQ/SAQ/SEQ/ structured Viva/OSPE
		Explain the mechanism of conduction of sound waves through the ear to the cochlea		
		Describe "Impedance Matching" and its importance		
		Describe the process of attenuation of sounds		
Physiology of taste	Explain the physiology of taste sensation and its pathway	Describe the primary sensations of taste	LGIS • CBL • Practical demonstration and performance	MCQ/SAQ/SEQ/ structured Viva/OSPE
		Describe the mechanism of stimulation of taste buds and the transmission of signals to CNS		
Physiology of olfaction	Explain the physiology of olfaction and its pathway.	Explain the physiological anatomy of olfactory membrane.	LGIS CBL	MCQ/SAQ/SEQ/ structured Viva
		Explain the mechanism of stimulation of olfactory cells.		
		Identify the primary sensations of smell		

		Describe the transmission of signals of olfaction into the central nervous system		
Practicals/SGDs: <ol style="list-style-type: none"> 1. Estimate bleeding clotting time. 2. Determination of DLC. 				
BIOCHEMISTRY				
Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Protein Chemistry & Metabolism	Relate the significance of different proteins in medicine	<ul style="list-style-type: none"> • Definitions, Biomedical importance and classification of proteins based on: • Physiochemical properties • Functional properties • Nutritional properties • Amino acids, their structure, properties and functions • Classification and nutritional significance of amino acids • Structure of proteins and their significance • Immunoglobulins and their biomedical significance • Plasma proteins & their clinical significance • Amino acid oxidation, transamination, deamination, decarboxylation, deamidation and transamination • Transport of Ammonia • Ammonia intoxication • Urea cycle 	Lectures SGD	MCQ SAQ/SEQ Structured viva
Practicals:				

Color reactions of proteins I, Ninhydrin test, Biuret test,

Color reactions of proteins II, Xanthoproteic test, Aldehyde test, Millon Nasse Test

Color reactions of proteins III, Sulphur Test

ORAL BIOLOGY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Tooth eruption & shedding	To understand the process of eruption and shedding and correlate it clinically	<ul style="list-style-type: none"> ▪ Define eruption, shedding, preeruptive tooth movement, eruptive tooth movement, post eruptive tooth movement, active eruption, passive eruption, Gaubernacular cord, Gaubernacular canal, natal teeth, neo natal teeth ▪ Differentiate the three types of physiological tooth movements (pre-eruptive, eruptive and post eruptive) in terms of direction of movement, movement in μm, need and significance ▪ Discuss mechanism and factors responsible for eruptive tooth movement ▪ Describe the three types of movement a tooth makes post eruption to maintain its functional position in the jaw in terms of mechanism and significance 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		<ul style="list-style-type: none"> ▪ Discuss histology and causes of tooth shedding ▪ Enlist local and systemic causes of premature and delayed eruption of teeth ▪ Identify in images/slides also draw and label Gaubernacular cord 		
Permanent molars	Demonstrate basic anatomy and anomalies of molars and differentiate it from the rest of the dentition.	<ul style="list-style-type: none"> ▪ Tabulate initiation of calcification, completion of enamel and root in terms of months/years ▪ Describe and identify, on models/images/teeth specimen, tooth surfaces, shape of mesial, distal, buccal, lingual/palatal and occlusal outlines, mesiodistal and buccolingual dimensions and contours, shape and curvature of cervical margin; boundaries of occlusal table, number, location, size, variation of cusps; name, number and location of pits, grooves and fossae, boundaries of fossae, location, size, location of marginal ridges, height of contour, contact area, mesial concavity, developmental depressions, location 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ/SEQ ▪ Viva ▪ OSPE

		<p>and formation of transverse ridge, location and formation of oblique ridge in case of maxillary molars, location and names of cusp ridges and inclined planes</p> <ul style="list-style-type: none"> ▪ Describe number, shape, inclination and variations of root/roots ▪ Describe number, location and significance of pulp canals and pulp horns Differentiate, on morphological basis, mandibular and maxillary molars, first and second molars of the same arch, molars and other permanent teeth ▪ Draw and label first, second and third molars from buccal, lingual/palatal, mesial, distal and occlusal aspect ▪ Carving of maxillary and mandibular first permanent molars according to normal tooth dimension on wax block/soap 		
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BDS YEAR I
BLOCK III
MODULE VIII
NEUROSCIENCES & NUTRITION
Duration: 06 weeks

Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructional Strategy	Assessment Tool
By the end of the module students will be able to:				
GROSS ANATOMY				
Nervous system-I	Correlate the general anatomical structure of different parts of nervous system, with its functional significance	Appraise general concept of nervous system. <ul style="list-style-type: none"> • Nervous Tissue • Receptors • Nerve fiber • Neuroglia Identify the parts of the nervous system contributing information of central and peripheral nervous system Describe the formation, course and distribution of a typical spinal nerve	LGIS/ SGD	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ • Structured Viva
Nervous system-II	Appraise the basic organization of the main structures that form nervous system	<ul style="list-style-type: none"> • Define the grey matter, white matter, ganglion, nucleus and nerve. • Appraise a three-dimensional appreciation of the parts of the brain and their relative positions to one another • Outline the anatomical organization of autonomic nervous system 		
Embryology				
CNS	Comprehend the embryological basis behind formation of different components of nervous system and correlate them with various relevant clinical presentations	<ul style="list-style-type: none"> • Explain the development of spinal cord. • Describe the positional changes of the cord. • Explain the causes of neural tube defects • Enlist various variants of spina bifida. • Explain the process of development of various variants of spina bifida 		

		<ul style="list-style-type: none"> Summarize primary and secondary brain vesicles with their derivatives Discuss birth defects associated with defective development of neural tube 		
Gross Neuroanatomy				
Anatomy of cranial cavity	Appraise the gross features of cranial cavity and the structures contained within it to understand the anatomical basis of clinical conditions related to them.	<ul style="list-style-type: none"> Describe and demonstrate the boundaries and gross features of cranial fossae. Enlist and demonstrate foramina along with structures passing through them in anterior, middle and posterior cranial fossae. Recognize and demonstrate the important sutures, fontanelle and impressions on the interior of cranial vault. 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva
Gross Anatomy of Spinal cord	Correlate the position and functions of the main nervous pathways and nerve cell groups in the spinal cord, with associated segmental injuries and diseases.	<ul style="list-style-type: none"> Explain the gross appearance and the nerve cell groups in the anterior, posterior and lateral gray columns of spinal cord Enumerate and illustrate the arrangements of ascending and descending tracts (white matter) in spinal cord at various levels. Explain the given clinical conditions related to ascending and descending tracts of spinal cord. Trace following pathways of superficial and deep sensations indicating the location of first, second and third order neurons. Pain and temperature pathways Light touch and pressure 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva

		<p>pathways</p> <ul style="list-style-type: none"> • Discriminative touch, vibratory sense and conscious muscle joint sense. • -Muscle joint sense pathways to the cerebellum • Posterior spinocerebellar tract • Anterior spinocerebellar tract • Trace following pathways of voluntary movements indicating the location of first, second and third order neurons. • Cortico spinal tracts 		
Gross anatomy of the brainstem	Appraise the anatomy of brainstem to assess the signs and symptoms presented by the patient in identifying the exact location of a structural lesion.	<ul style="list-style-type: none"> • Describe the gross appearance and internal structure of the medulla oblongata. • Illustrate the cross sections of medulla oblongata at different levels. • Apply the knowledge of neuroanatomy to explain the following clinical conditions: <ul style="list-style-type: none"> - Arnold-chiari malformation - Medial medullary syndrome - Lateral medullary syndrome - Wallenberg syndrome • Describe the gross features and internal structure of pons. • Illustrate cross section of pons at different levels showing major structures at each level. • Analyze the anatomical structures involved in pontine hemorrhage and 	LGIS/ SGD	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ • Structured Viva

		<p>infarction of pons.</p> <ul style="list-style-type: none"> Describe the gross appearance, internal structure of mid brain. Illustrate cross section of midbrain at the levels of superior colliculus and inferior colliculus showing major structures at each level. Justify the lesions of midbrain structures by the blockage of cerebral aqueduct. Identify the gross features of medulla, midbrain and pons on a given model. 		
Gross anatomy of cerebellum and its connections	Outline the structure, function and connections of the cerebellum with the remainder of the central nervous system to understand the anatomical basis of cerebellar dysfunctions.	<ul style="list-style-type: none"> Briefly demonstrate the gross features and phylogenetic divisions of cerebellum. Enumerate afferent and efferent fibers of superior, middle and inferior cerebellar peduncles. List intracerebellar nuclei and types of fibers constituting white matter of cerebellum and. List disturbances of voluntary movements, reflexes, ocular movements, speech, posture and gait resulting due to lesions of cerebellum. <p>Demonstrate different parts of cerebellum on given model.</p>	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva
Gross anatomy of cerebrum	Appraise the structure, function and connections of the cerebrum with the remainder of the central nervous system to understand the	<ul style="list-style-type: none"> Describe the topographic anatomy of diencephalon and demonstrate its gross features on a given model. Enlist main sulci and gyri of cerebral hemispheres and describe the extent of each 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva

	anatomical basis of associated clinical conditions	<p>of them.</p> <ul style="list-style-type: none"> • Explain the divisions of cerebral lobes on superolateral, medial and inferior surfaces of cerebral hemispheres. • Enumerate fibers making up the white matter of cerebral hemispheres and describe each of them (Summarize parts, relations & fibers forming Internal capsule). • Mark main sulci and gyri on lobes of cerebral hemispheres. • Identify commissural, projection and association fibers on brain prosected specimen • Describe and demonstrate the cortical functional areas in different lobes of cerebral hemispheres. • Enumerate types of aphasia and describe the lesions of speech areas responsible for producing aphasia. • Explain the effects of lesion in the primary and secondary visual cortex. • Illustrate the lateral and medial views of cerebral hemispheres showing motor and sensory areas. 		
Gross anatomy of reticular formation and limbic system	Correlate the structure and function of the reticular formation and parts of the limbic system with associated clinical conditions.	<ul style="list-style-type: none"> • Outline the general arrangement and functions of reticular formation. • Enumerate components of limbic system and explain hippocampal formation with reference to its afferent and efferent connections. • Identify different components of limbic system on given model. 	LGIS/ SGD	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ • Structured Viva

Gross anatomy of basal nuclei	Recognize the location, connections and functions of basal nuclei to explain its common relevant diseases	<ul style="list-style-type: none"> List terminology commonly used to describe the basal nuclei. Outline Parkinson disease regarding etiology, characteristics signs and symptoms, types and treatment Identify different components of basal ganglia on given model/specimen 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva
Gross anatomy of cranial nerves	Appraise the location and connections of motor and sensory nuclei of the cranial nerves to identify the correct site of relevant cranial nerve lesions.	<ul style="list-style-type: none"> Enumerate the cranial nerves and classify them into sensory, motor and mixed nerves. Describe the nuclei and intracranial course of all cranial nerves. Apply the knowledge of neuroanatomy to explain the clinical conditions regarding the lesions of various cranial nerves. Identify different cranial nerves on given model/specimen 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva
Gross anatomy of thalamus, hypothalamus and their connections	Appraise the structure, function and connections of the thalamus and Hypothalamus with the remainder of the central nervous system to understand the anatomical basis of associated clinical conditions.	<ul style="list-style-type: none"> Describe the divisions, nuclei and connections of thalamus. Summarize the connections of hypothalamus with the pituitary gland. Enlist the functions of main hypothalamic nuclei. 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva
Gross anatomy of Meninges and dural venous	Appraise the arrangement of the meninges of brain and spinal cord to identify different types of	<ul style="list-style-type: none"> Define meninges of brain and describe the Dural reflections in brain. Explain the meninges of spinal cord 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva

sinuses of brain and spinal cord	cerebral hemorrhages.	<ul style="list-style-type: none"> Enumerate the nerves and blood vessels supplying the meninges. Differentiate among different varieties of intracranial hemorrhages. Demonstrate the supratentorial and Infratentorial compartments of tentorium cerebelli in a prosected specimen. Define and enumerate paired and unpaired Dural venous sinuses along with their attachments. Describe the location, important relations, communications of cavernous sinus and enumerate structures passing through it. 		
Gross anatomy of ventricular system, CSF, Blood brain barriers	Appraise the anatomical organization of ventricular system, CSF, Blood brain & blood-CSF barriers to explain the relevant clinical scenarios	<ul style="list-style-type: none"> Describe the anatomical organization of ventricular system and boundaries of third ventricle and choroidal plexus of each ventricle. Define arachnoid villous and outline the role of arachnoid villi in absorption of CSF. Outline the formation of different barriers of brain. Summarize the floor of fourth ventricle. 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva
Gross anatomy of ventricular system, CSF, Blood brain barriers	Appraise the anatomical organization of ventricular system, CSF, Blood brain & blood-CSF barriers to explain the relevant clinical scenarios	<ul style="list-style-type: none"> Describe the anatomical organization of ventricular system and boundaries of third ventricle and choroidal plexus of each ventricle. Define arachnoid villous and outline the role of arachnoid villi in absorption of CSF. Outline the formation of different barriers of brain. Summarize the floor of 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva

		fourth ventricle.		
Blood supply of the brain and spinal cord	Outline the blood supply of the brain and spinal cord	<ul style="list-style-type: none"> Recognize the blood supply of different parts of brain and spinal cord. Outline the formation and importance of veins of brain. Enumerate the vessels taking part in formation of circle of Willis with its importance. Relate the interruption of cerebral circulation of cerebral artery syndromes due to anterior, middle and posterior cerebral artery occlusion. Illustrate circle of Willis. 	LGIS/ SGD	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva

Neurosciences

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Sensory receptors & receptor Potential	Interpret the physiological mechanisms controlling the functions of sensory system.	<ul style="list-style-type: none"> Classify the various types of sensory receptors. Explain the sensory stimuli and differential sensitivity of receptors. Explain the sensory transduction into nerve impulses. Describe the local electrical currents at nerve endings— receptor potentials, adaptation of receptors Classify the nerve fibers that transmit different types of signals on the physiological basis. Describe the transmission of signals of different intensity in nerve tract (spatial and temporal summation) 	LGIS	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured Viva
Sensory tracts and cortex	Explain the dorsal column medial lemniscal system	<ul style="list-style-type: none"> Identify the sensations carried by different sensory 	LGIS	<ul style="list-style-type: none"> MCQ SAQ/SEQ

	and anterolateral pathways	tracts <ul style="list-style-type: none"> • Differentiate between different sensory tracts • Describe the somatosensory cortex and somatosensory association areas • Explain the various thermal sensations, thermal receptors and their excitation and transmission of thermal signals in the nervous system 		<ul style="list-style-type: none"> • Structured Viva
Brain analgesia system	Correlate the pathophysiological basis of pain pathways to their clinical significance	<ul style="list-style-type: none"> • Classify the different types of pain. • Compare and contrast the perception and transmission of the different types of pain. • Explain the pain suppression system in the brain and spinal cord. • Describe the brain's opiate system—endorphins and enkephalins. • Describe the clinical abnormalities of pain and other somatic sensations • Explain pathophysiological significance of referred and visceral pain 	LGIS	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ • Structured Viva
Motor system / Spindle / stretch reflex	Interpret the physiological mechanisms controlling the functions of motor system and higher mental functions.	<ul style="list-style-type: none"> • Relate the organization of grey and white matter in spinal cord to the pathophysiology of various spinal cord injuries. • Explain the role of proprioceptors (muscle spindles and Golgi tendon organs) in motor movements • Explain stretch reflex • Describe the flexor reflex and the crossed extensor reflex. 	LGIS	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ • Structured Viva

		<ul style="list-style-type: none"> • Explain the reciprocal inhibition and reciprocal innervation. • Identify the reflexes of posture and locomotion in the spinal cord. 		
	Correlate functions and abnormalities of basal ganglia and cerebellum	<ul style="list-style-type: none"> • Explain physiological anatomy of cerebellum and basal ganglia • Explain significance of basal ganglia and cerebellum in motor control 	LGIS	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ • Structured Viva
Hypothalamus	Correlate physiological anatomy with disorders of hypothalamus	Explain functions of hypothalamic nuclei	LGIS	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ • Structured Viva

Practicals/SGDs:

1. Examine the 1ST – 6TH Cranial nerves on an SP
2. Examine the 7th – 12th Cranial nerves on an SP

BIOCHEMISTRY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
Nutrition	<ul style="list-style-type: none"> • Appraise the nutritional requirements of each food constituent for better understanding of relevant disorders • Outline nutritional requirement in different commonly occurring disorders 	<ul style="list-style-type: none"> • Balanced Diet, DRIs (EAR, RDA, AI, UL), AMDR • Proteins (Protein turnover, Amino acid Pool, Nitrogen Balance, Protein Quality, Protein Requirement) • Biomedical importance, requirements of dietary Carbohydrates, Proteins and Lipids • Glycemic Index • Protein-Energy Malnutrition (Kwashiorkor, Marasmus) 	<ul style="list-style-type: none"> • Lectures • SGD • PBL • CBL 	MCQ/ SAQ/SEQ

	Review hazards of under and over nutrition			
Vitamins	Discuss the importance of Vitamins in Health	<ul style="list-style-type: none"> • Introduction, classification • Fat soluble vitamins: chemistry, biochemical functions, deficiency manifestations, • daily allowances, sources and hypervitaminosis • Water soluble vitamins: chemistry, biochemical functions, deficiency manifestations, • daily allowances, sources and hypervitaminosis 	<ul style="list-style-type: none"> • Lectures • SGD • PBL • CBL 	MCQ/ SAQ/SEQ
Minerals and Trace elements	<ul style="list-style-type: none"> • Classifying minerals • Discuss • Biochemical roles of minerals 	<ul style="list-style-type: none"> • Classification and biochemical role of Macro minerals (Na, K, Ca, Cl, PO₄) • Classification and biochemical role of Micro minerals (Fe, Zn, Mg, Se, I, F, Cu, Cr, Cd, Mn) • Mechanism of HG toxicity 	<ul style="list-style-type: none"> • Lectures • SGD • PBL • CBL 	MCQ/ SAQ/SEQ

Integration of Metabolism	<ul style="list-style-type: none"> Discuss the biochemical basis of obesity & Diabetes Mellitus Relate the significance of ketone bodies Outline metabolic role of insulin & Glucagon 	<ul style="list-style-type: none"> Obesity Diabetes Mellitus Ketone bodies and their biomedical significance Metabolic role of Insulin & Glucagon 	<ul style="list-style-type: none"> Lectures SGD PBL CBL 	MCQ/ SAQ/SEQ
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Practicals:

Estimation of vitamin c by Titration method

ORAL BIOLOGY

Topic/ Theme	Learning outcomes	Learning Objectives/Contents	Instructional strategies	Assessment tool
TMJ	Correlate the gross anatomical features of temporomandibular joint with clinical significance	<ul style="list-style-type: none"> Identify the type of TMJ. Identify the articular surfaces of TMJ on a given model or dry bones. Explain the attachments of capsule. Name the ligaments of TMJ. Describe the attachments and relations of ligaments of TMJ. Describe the type and shape of articular disc. Justify the presence of two joint cavities and types of movements occurring in each. Describe the movements of jaw at TMJ with special reference to axis and muscles producing them. Describe the clinical signs of anterior dislocation of TMJ and explain the steps of its reduction 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ Viva OSPE

Salivary glands	Correlate the development, anatomy and physiology of Salivary glands with its clinical significance	<ul style="list-style-type: none"> • Describe the anatomy of major salivary glands • Describe functions of saliva • Describe production and modification of saliva • Describe histology of major and minor salivary glands <ul style="list-style-type: none"> ▪ Describe the neurovascular supply ▪ Describe development of salivary glands ▪ Apply basic knowledge of salivary glands with age changes and clinical scenarios 	<ul style="list-style-type: none"> ▪ Lectures SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva OSPE
Repair and regeneration	Relate the basic concepts of repair and regeneration in orofacial tissues and in various clinical scenarios	<ul style="list-style-type: none"> ▪ Describe the process of repair in oral mucosa ▪ Describe repair and regeneration of dental hard and soft tissues 	<ul style="list-style-type: none"> ▪ Lectures SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva OSPE
Deciduous dentition	Demonstrate basic anatomy of deciduous dentition and differentiate it from the permanent dentition.	<ul style="list-style-type: none"> ▪ Describe general morphological differences between permanent and deciduous teeth ▪ Describe and identify, on models/images/teeth specimen, tooth surfaces, shape of mesial, distal, buccal, lingual/palatal and occlusal outlines, mesiodistal and buccolingual dimensions and contours, boundaries of occlusal table, number, location, size, variation of cusps; name, number and location of pits, grooves and 	<ul style="list-style-type: none"> ▪ Lectures SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva OSPE

		<p>fossae, boundaries of fossae, location, size, location of marginal ridges, height of contour, developmental depressions, location and formation of transverse and oblique ridge.</p> <ul style="list-style-type: none"> ▪ Describe number, shape, inclination of root/roots ▪ Describe number, location and significance of pulp canals ▪ Differentiate, on morphological basis, deciduous incisors vs permanent incisors, mandibular vs maxillary deciduous molars, first vs second molars of the same arch, deciduous vs permanent molars ▪ Draw and label deciduous teeth from labial/buccal, lingual/palatal, mesial, distal and incisal/occlusal aspect 		
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BDS YEAR I
BLOCK III
MODULE IX
DIGESTIVE SYSTEM
Duration: 02 weeks

ANATOMY

Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructional Strategy	Assessment Tool
By the end of the module students will be able to:				

7-8 week

**Digestive system and
Metabolism**

HISTOLOGY

GIT (lip, Tongue, esophagus, and salivary glands)	<p>Appraise the light microscopic structure of lip and tongue, with special emphasis on Papillae of tongue and taste buds.</p> <p>Appraise the light microscopic structure of major salivary glands</p>	<p>Knowledge</p> <ul style="list-style-type: none"> Explain the histological structure of lip. Describe the microscopic structure of tongue, with special reference to epithelium on its two surfaces, types of lingual papillae and taste buds with their location and structure Describe the Histological features of parotid, submandibular and sublingual glands with reference to their type, parenchyma, stroma and duct system. Describe the histological structure of esophagus. <p>Skills</p> <ul style="list-style-type: none"> Identify microscopic sections of lip, tongue, submandibular, sublingual and parotid glands and esophagus under light microscope and enlist at least two identification points of each. Draw labelled diagrams showing light microscopic structure of lip, tongue, submandibular, sublingual and parotid glands 	LGIS / SGD	MCQ/SAQ/ OSPE/ structured viva
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Gross (GIT)

GIT		<ul style="list-style-type: none"> Identify abdominal lines and planes dividing the abdomen into its quadrants. Enlist the structures in each quadrant Outline of gross features of stomach, small intestine, colon rectum and anal canal. Enlist the blood vessels that supply gut. Describe the formation and distribution of portal vein. 		
Hepatobiliary system		<ul style="list-style-type: none"> Describe location, lobes, coverings and ligaments of liver. Describe dual blood supply of the liver. Learn the components of the biliary apparatus and trace the drainage of bile from liver to duodenum. 	LGIS / SGD	MCQ/SAQ/ OSPE/ structured viva

PHYSIOLOGY

GIT

Topic/ Theme	Learning outcomes	Learning objectives/content	Instructional strategies	Assessment tool
Neural control of GIT	Analyze the interplay of autonomic and enteric nervous system in GI motility	<ul style="list-style-type: none"> Appraise physiologic anatomy of gastrointestinal tract with specific focus on role of interstitial cells of Cajal Compare functions of mesenteric and myenteric plexuses Link the role of autonomic nervous system in GI motility 	LGIS / SGD	MCQ/SAQ/ structured viva

Food Processing in oral cavity	Correlate the Pathophysiology of Mastication and deglutition with specified clinical presentations	<ul style="list-style-type: none"> Recognize the role of teeth, tongue, cheeks and saliva in assimilation and digestion of food. Distinguish three phases of deglutition reflex Outline different types of peristalsis in esophagus are taking place 	LGIS	MCQ/SAQ/structured viva
Vomiting reflex	Describe mechanism (stimuli, pathways, center) and clinical significance of vomiting reflex	<ul style="list-style-type: none"> Explain the mechanism of vomiting reflex Appraise the location and function of vomiting center/chemoreceptor trigger zone in the brain 	LGIS	MCQ/SAQ/structured viva
Liver	To analyze the non-metabolic functions of liver	<ul style="list-style-type: none"> Explain the role of liver in non-metabolic domains and give clinical importance of each 	LGIS	MCQ/SAQ/Structured viva
Food processing in stomach	Correlate structure with function of stomach	<ul style="list-style-type: none"> Describe motor function of stomach Recognize role of gastric secretions in the process of digestion Explain factors which regulate stomach emptying 	LGIS	MCQ/SAQ/Structured viva
Secretory functions of alimentary canal	Correlate secretions of small intestine and colon with functions	<ul style="list-style-type: none"> Explain role of pancreatic and biliary secretion in process of digestion Correlate secretions of small intestine and colon with functions Give absorption of various nutrients in small and large intestine 	LGIS	MCQ/SAQ/Structured viva
Practicals/SGDs: <ol style="list-style-type: none"> 1. Perform Deep Tendon reflexes 2. Perform Superficial reflexes on an SP 				

BIOCHEMISTRY

Topic/ Theme	Learning outcomes	Learning objectives/content	Instructional strategies	Assessment tool
Biochemistry of GIT	Relate the knowledge of biochemistry of GIT to different clinical scenarios	<ul style="list-style-type: none"> • Overview of digestion and absorption of Lipids, Carbohydrates, Proteins, nucleic acids. Nucleotides and neuclosides • Introduction, composition, functions, secretion, stimulants and depressants of: <ul style="list-style-type: none"> - Saliva - Gastric juice - Bile - Pancreatic juice - Succus entericus 	<ul style="list-style-type: none"> • Lectures • SGD • PBL • CBL 	MCQ/ SAQ/SEQ

ORAL BIOLOGY

Topic/ Theme	Learning outcomes	Learning objectives/content	Instructional strategies	Assessment tool
Taste	Correlate the anatomical knowledge for understanding process of taste	<ul style="list-style-type: none"> • Describe taste pathway along with its neurological control from higher centers • Describe taste receptor cells, tastants and taste buds. 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE
Mastication	Correlate the anatomical knowledge for understanding process of mastication	<ul style="list-style-type: none"> • Describe mastication in terms of structural apparatus, muscles involved, chewing cycle (opening, closing and occlusal phase) and neurological pathway controlling mastication • Enumerate stages of mastication (pull back process of tongue, squeeze back mechanism), and reflexes of mastication (jaw jerk 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

		reflex, jaw unloading reflex, jaw open reflex)		
Occlusion	Demonstrate understanding of Occlusion	<ul style="list-style-type: none"> • Define occlusion, articulation, freeway space (normal value in mm), leeway space (normal value in mm), normal class 1 occlusion (incisal, canine and molar relation), malocclusion (I, II and III), centric occlusion, centric relation, primate space, ugly duckling stage, diastema • Describe features of ideal occlusion in terms of spacing, vertical inclination, overjet, overbite, and generalized spacing between the teeth in primary dentition • Describe features of ideal occlusion in mixed and permanent dentition • Define over jet (along with normal value in mm), increased, decreased, edge-to-edge and reverse overjet • Define over bite (along with normal value in mm), deep bite, open bite and closed bite • Define three types of molar relations in primary dentition (mesial step, distal step, flush terminal plane) • Describe occlusal curvatures (curve of Spee, Wilson and Monsoon) along with formation, direction, shape and significance 	<ul style="list-style-type: none"> ▪ Lectures ▪ SGD 	<ul style="list-style-type: none"> ▪ MCQ ▪ Viva ▪ OSPE

BDS YEAR I
BLOCK III
MODULE X
RENEAL SYSTEM
Duration: 02 weeks

ANATOMY				
Topic/ Theme	Learning Outcomes	Learning Objectives / Contents	Instructional Strategy	Assessment Tool
	By the end of the module students will be able to:			
Gross Anatomy				
Renal system	Comprehend the topographical anatomy of renal system.	<ul style="list-style-type: none">Describe the gross features of kidney, relations, and its coverings SkillIdentify the impressions of surrounding structures on both kidneys in the given model	LGIS/ SGD	MCQ/SAQ/ structured viva / OSPE
PHYSIOLOGY				
RENAL				
Theme/topic	Learning outcomes	Learning objectives/content	Teaching strategy	Assessment tool
Edema	Elucidate edema types, clinical significance and factors responsible for causing edema	<ul style="list-style-type: none">Explain TBW content and its distribution in different body compartmentsGive composition of ICF and ECFAnalyze the role of starling forces and other safety factors (lymphatics, negative ISF pressure) in prevention of edema.	LGIS	MCQ/SAQ/str uctured viva
Functional anatomy of kidney	Recognize functions of kidneys.	<ul style="list-style-type: none">Outline the physiological anatomy of nephron and glomerular capillary membrane	LGIS	MCQ/SAQ/str uctured viva

		<ul style="list-style-type: none"> List primary and endocrinal functions of kidney Physiology of micturition reflex 		
Glomerular Filtration	Analyze the process of formation of glomerular filtrate and its regulation	<ul style="list-style-type: none"> Relate the determinants of GFR to clinical conditions. Identify the parameters involved in autoregulation of GFR and blood flow. Explain renal tubular reabsorption and secretion Discuss effects of arterial pressure on urine output (pressure natriuresis, pressure diuresis and renin angiotensin system) Discuss renal function test 	LGIS	MCQ/SAQ/structured viva

Practicals/SGDs:

Record the normal body temperature

BIOCHEMISTRY

Theme/topic	Learning outcomes	Learning objectives/content	Teaching strategy	Assessment tool
Nucleotides	Relate the knowledge of chemistry and metabolism of nucleotide in health and disease	<ul style="list-style-type: none"> Nucleic acids, their types, structure and functions Chemistry and structure of nucleotides and their biochemical role Nucleotides derivatives and their biochemical role 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ SAQ/SEQ Structured viva

Acid Base balance	Demonstrate understanding of biochemistry of pH of body fluids	<ul style="list-style-type: none"> • Ionization of water and weak acids and bases • Concept of pH and pH scale • Dissociation constant & titration curve of weak acids, the concept of pK values • Buffers, their mechanism of action • Henderson-Hasselbalch Equation (No derivation) • Electrolyte balance • Metabolism of electrolytes • Production of acids by the body • Production of bases by the body • Maintenance of blood pH by blood buffer, respiratory mechanism & renal mechanism • Disorders of Acid base balance 	<ul style="list-style-type: none"> • Lectures • SGD 	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ • Structured viva
Practicals: Normal Organic constituents of urine Abnormal Organic constituents in urine Abnormal Inorganic constituents in urine (serum electrolyte analyzer) Preparation of urine report				
ORAL BIOLOGY				
Theme/topic	Learning outcomes	Learning objectives/content	Teaching strategy	Assessment tool

Development of occlusion	Demonstrate understanding of Occlusion	<ul style="list-style-type: none"> Describe the various stages of dentition (gum pad stage, primary, mixed and permanent stages) Describe early and late shifts 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ Viva OSPE
Developmental anomalies of teeth	Apply the knowledge of developed & morphological anomalies for understanding clinical scenarios	<ul style="list-style-type: none"> Define and discuss developmental causes and morphological appearance of effected teeth in anodontia, hypodontia, mesiodens, distodens, macrodontia, microdontia, taurodontium, dilacerations, flexion, germination, fusion, concrescence, segmented roots, dwarfed roots, hypercementosis, accessory cusps, accessory roots, enamel pearls, peg laterals, Talon's cusp, Hutchinson's incisors, Mulberry molars, dens in dente, complex odontoma, compound odontoma, enamel dysplasia, dentin dysplasia, enamel hypoplasia, enamel hypocalcification, enamel hypomaturation, amelogenesis imperfect, mottled enamel, 	<ul style="list-style-type: none"> Lectures SGD 	<ul style="list-style-type: none"> MCQ Viva OSPE

		<p>dentinogenesis imperfect, tetracycline staining, Turner's tooth</p> <ul style="list-style-type: none"> ▪ Enlist common anomalies effecting development, size, number and shape of teeth 		
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BDS Curriculum Year-I (2023)