



**ALTAMASH INSTITUTE OF DENTAL MEDICINE
(JINNAH SINDH MEDICAL UNIVERSITY)**

**BDS First Year
Oral Biology
Study Guide**

INTRODUCTION:

Oral Biology is the study of embryology (pre- and post-natal growth), oral physiology, gross anatomy, histology, and development, with a focus on dental hard and soft tissue (enamel, dentin, pulp, and periodontium) and extra oral structures (salivary glands and TMJ). Tooth Morphology is a subfield of Oral Biology that studies the morphology of each tooth in the dentition as well as the development of occlusion.

Oral Biology provides fundamental knowledge in the aforementioned areas, as well as clinical aspects and integration with other basic sciences subjects. Tooth Morphology is used in conjunction with Orthodontics and Operative Dentistry to help clinicians achieve the best clinical results when rearranging and restoring teeth.

OUTCOMES:

By the end of this term students should be able to:

1. describe basic dental terminologies and identify the normal anatomical structures of oral cavity.
2. discuss the embryonic development of oral structures and their related anomalies.
3. Apply clinical knowledge of human oral anatomy to solve questions regarding functions and diseases.

Teaching and learning:

1. Flipped Classroom (FC)
2. Interactive lectures (IL)
3. Tutorials
 - a. Case based discussion (CBD)
 - b. Small group discussion (SGD)

Assessment tools:

1. Multiple Choice Questions: (MCQs)
 - One Correct Type
 - One Best Type
2. Observed structured practical examination (OSPE)
3. Short Answer Question (SAQs)



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s.n o.	Topic	Course Objectives: By the end of the course, 1st year students will be able to:	Teaching method	Assessment Tool
1	Introduction to Structures of Oral Tissues	<ul style="list-style-type: none"> • Discuss the clinical application of oral biology. • List all structures of a tooth. • Identify structures of a tooth on models. • Identify the supporting structures of a tooth on pictures and models. • Differentiate among the various supporting structures of a tooth. • Discuss the clinical relevance of enamel, dentine, cementum, periodontal ligament • Discuss age-related changes of the enamel, dentine, cementum, periodontal ligament 	<p>IL</p> <p>SGD</p>	<p>MCQs</p>
2	General Embryology	<ul style="list-style-type: none"> • Discuss germ cell formation, fertilization and prenatal development. • Describe Induction, Competence, and Differentiation. • Discuss the development of three-layered embryo and the neural tube • Describe the fate of germ layer. 	<p>IL</p> <p>SGD</p>	<p>MCQs</p> <p>SAQs</p>
3	Embryology of Head Face & Oral Cavity	<ul style="list-style-type: none"> • List the derivatives of pharyngeal arches and pouches • List the types of teratogens. • Discuss the development of the following structures of the embryo: <ul style="list-style-type: none"> ○ Head ○ Face ○ Palate ○ Tongue ○ Skull ○ Maxilla ○ Mandible ○ Temporomandibular joint • Differentiate between the following processes: • Intramembranous and cartilaginous ossification; • Development of maxilla and mandible. • Discuss the various types of clefts of lip and 	<p>IL</p> <p>CBL</p>	<p>MCQs</p> <p>SAQs</p>



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		palate.		
4	Cytoskeleton, Cell Junctions, Fibroblasts, and Extracellular Matrix	<ul style="list-style-type: none"> • Define the cytoskeleton. • Differentiate among the various types of filaments • Differentiate among the various types of intercellular junctions. • Discuss fibroblasts and its secretory products. 	IL	MCQs
			SGD	SAQs
5	Development of The Tooth and Its Supporting Tissues	<ul style="list-style-type: none"> • Discuss the development of the following structures: <ul style="list-style-type: none"> ○ Primary epithelial band; ○ Dental lamina; ○ Vestibular lamina; ○ Hard tissues of tooth; ○ Root. • Differentiate among the various stages of tooth development; • Differentiate between the single and multi-rooted tooth development. • Discuss the theories of tooth type determination. 	IL	MCQs
6	Bone	<ul style="list-style-type: none"> • Describe the composition and histology of bone. • Describe the structure and functions of bone cells. • Differentiate between endochondral and intramembranous bone formations. • Explain the histology of endochondral and intramembranous bones. 	IL	MCQs
7	Enamel: Composition, Formation, & Structure	<ul style="list-style-type: none"> • Describe the composition, physical properties and histological features of enamel. • Differentiate among the various stages of amelogenesis • Identify the histological features of enamel on slides and pictures 	IL	MCQs
8	Dentin-Pulp Complex	<ul style="list-style-type: none"> • Describe the composition, formation and histological landmarks of dentine. • Discuss the cells of dental pulp. • Critically analyze theories of dentine sensitivity. 	IL	MCQs



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13	Temporomandibular Joint	<ul style="list-style-type: none"> • Classify joints • List examples of each type of joint • Describe the macroscopic and microscopic structures of a joint • Discuss the muscles of temporomandibular joint • Describe the innervations and blood supply of TMJ • Relate the muscle attachments with various movements of TMJ 	IL	MCQs
14	Facial Growth & Development	<ul style="list-style-type: none"> • Discuss various facial types and profiles. • Relate the facial profiles with gender and age. • Describe facial growth 	IL	MCQs
15	Repair And Regeneration of Oral Tissues	<ul style="list-style-type: none"> • Discuss the various phases of bone healing in oral mucosa. • Describe the bone healing act at dentinogingival junction. • Discuss the repair of enamel, dentine-pulp complex and periodontium. 	IL	MCQs
16	Introduction to Dental Anatomy	<ul style="list-style-type: none"> • Discuss the importance and clinical application of oral biology • Discuss the primary, transitional and permanent dentition periods • Discuss the various tooth numbering systems • Describe the surfaces and landmarks of teeth • Identify the primary, transitional and permanent dentition periods on pictures • Identify the teeth on the basis of various tooth notation systems on models and pictures • Identify the surfaces and landmarks of teeth on models. 	IL	MCQs
17	Development and Eruption of The Teeth	<ul style="list-style-type: none"> • Describe the patterns of eruption of primary and permanent teeth. • Estimate the dental age of an individual on images and models. 	IL	MCQs
18	The Primary	<ul style="list-style-type: none"> • Identify various deciduous teeth on models and pictures 		



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	(Deciduous) Teeth	<ul style="list-style-type: none"> Describe the landmarks and endodontic structures of various deciduous teeth 	IL	MCQs
19	Forensic Odontology	<ul style="list-style-type: none"> Define forensic dentistry. Describe the methods of identification of unidentified individuals. Discuss application of forensic dentistry 	FC	SAQs
20	Orofacial complex: form and function	<ul style="list-style-type: none"> Describe the physiological form of the teeth and periodontium Describe contact areas, interproximal spaces and embrasures. Identify contact areas, interproximal spaces and embrasures on models and pictures. 	IL	MCQs
21	The Permanent Maxillary Incisors	<ul style="list-style-type: none"> Identify maxillary incisors on models and pictures. Describe the landmarks and endodontic structures of maxillary incisors. Compare the macroscopic structure of maxillary central incisor with that of the lateral incisor 	IL SGD	MCQs
22	The Permanent Mandibular Incisors	<ul style="list-style-type: none"> Identify mandibular incisors on models and pictures. Describe the landmarks and endodontic structures of mandibular incisors. Compare the macroscopic structure of mandibular central incisors with that of the lateral incisor 	IL SGD	MCQs
23	The Permanent Canines: Maxillary And Mandibular	<ul style="list-style-type: none"> Identify canines on models and pictures. Describe the landmarks and endodontic structures of canines. Compare the macroscopic structure of maxillary canine with that of the mandibular canine 	IL	MCQs
24	The Permanent Maxillary Premolars	<ul style="list-style-type: none"> Identify maxillary first and second premolars on models and pictures. Describe the landmarks and endodontic structures of maxillary first and second premolars Compare the macroscopic structure of maxillary first premolar with that of the maxillary second premolar 	IL	MCQs



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25	The Permanent Mandibular Premolars	<ul style="list-style-type: none"> • Identify mandibular first and second premolars on models and pictures. • Describe the landmarks and endodontic structures of mandibular first and second premolars • Compare the macroscopic structure of mandibular first premolar with that of the mandibular second premolar 	IL SGD	MCQs
26	The Permanent Maxillary Molars	<ul style="list-style-type: none"> • Identify maxillary first, second and third molars on models and pictures. • Describe the landmarks and endodontic structures of maxillary first, second and third molars • Compare the maxillary molars on the basis of their macroscopic structures 	IL	MCQs
27	The Permanent Mandibular Molars	<ul style="list-style-type: none"> • Identify mandibular first, second and third molars on models and pictures. • Describe the landmarks and endodontic structures of mandibular first, second and third molars • Compare the mandibular molars on the basis of their macroscopic structures 	IL SGD	MCQs
PRACTICALS By the end of 1st year, Students will be able to;			Teaching method	Assessment Tool
1	Histology	Identify the normal histological features of following on Multi-head Microscope; <ul style="list-style-type: none"> ○ Structure of Human tooth ○ Development of tooth and supporting structures ○ Bone and its types ○ Dentin and Pulp ○ Salivary glands ○ Oral Mucosa 	Lab Demo	OSPE
2	Oral Anatomy	<ul style="list-style-type: none"> • Identify anatomical landmarks of both hard and soft tissue on Models • Identify deciduous and permanent teeth on models • Differentiate between various deciduous and permanent teeth based on anatomical differences using models • Draw permanent teeth on graph paper 	Lab Demo	OSPE



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		<ul style="list-style-type: none">• Label permanent teeth on graph paper• Carve permanent teeth on wax/soap		
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Reading Sources:

Text Book:

- Oral histology, development, structure and function. Ten Cate 9th edition
- Wheelers's dental anatomy, physiology and occlusion (Stanely J Nelson) 10th Edition

Reference books:

- Oral anatomy, histology, embryology (BJ Moxham,BKB Berkowitz) 5th Edition
- Concise dental anatomy and morphology(James J Fullers) 4th edition

Practical Lab: A place providing opportunity for experimentation, observation or practice in a field of study

Internet resources: With easy excess to digital library students will use internet resources with added time flexibility to enrich and update their knowledge and its application.

Library: It provides wealth of resources, space to study alone or in a group. It also provide world of books to discover and borrow.

Assessment Criteria :

Knowledge:

- MCQs (Multiple Choice Questions) are used to asses objectives covered in each module.
- A MCQ has a statement or clinical scenario followed by four options (likely answer).
- Students after reading the statement/scenario select ONE, the most appropriate response from the given list of options.
- Correct answer carries one mark, and incorrect 'zero mark'. There is no negative marking.
- Students mark their responses on an answer sheet provided by examination department.

Skills:

- OSPE: Objective Structured Practical Examination:
- Each student will be assessed on the same content and have same time to complete the task.
- Comprise of 12-25 stations.



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- Each station may assess a practical tasks include practical skills and application of knowledge
- Stations are observed, interactive, application of knowledge based and rest.
- In Observed and Interactive Stations these will be assessed by internal or external examiners through structured viva or a task.
- Application of knowledge Stations: it will be static stations in which there will be pictures, clinical scenarios with related questions for students to answer on the provided answer copy.
- Rests: It is a station where there is no task given and in this time student can organize his/her thoughts.

AIDM Internal Assessment Policy

Students will be assessed to determine achievement of learning objectives through the following:

- Midterm Examination will be scheduled on completion of half of the course
- Mock Examination will be scheduled on completion of whole course
- The method of examination comprises theory exam which includes MCQs, and practical examination by OSPE (Objective Structured Practical Examination).
- Student's behaviors and attitudes will be observed during all academic activities.

Annual Examination:

- Marks of both internal assessments will constitute 20% weightage as per JSMU policy.
- University Annual examination will be based on MCQs and OSPE.

Attempts: There are 2 attempts in the third professional examination only. 2nd attempt is the supplementary examination which if not passed student has to repeat the year.

Course Evaluation:

- Pass/fail ratio of continuous and summative assessments will be evaluated.
- 75% attendance is mandatory to be eligible for annual professional examination
- Feedback will be taken
 - Regarding course from students and faculty
 - Student feedback regarding faculty
 - Faculty feedback of students



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Course Faculty:

Dr Mansoor Majeed
Assistant Professor (HOD)
Dr Sara Gardezi
Assistant Professor
Dr Samrah Jawed
Demonstrator
Dr Zunera Khalid
Demonstrator

For queries:

Department of Medical Education

Dr. Shaur Sarfaraz
Director & Assistant Professor
shaur.sarfaraz@altamash.pk

Dr. Maria Ghani
Lecturer,
maria.ghani@altamash.pk