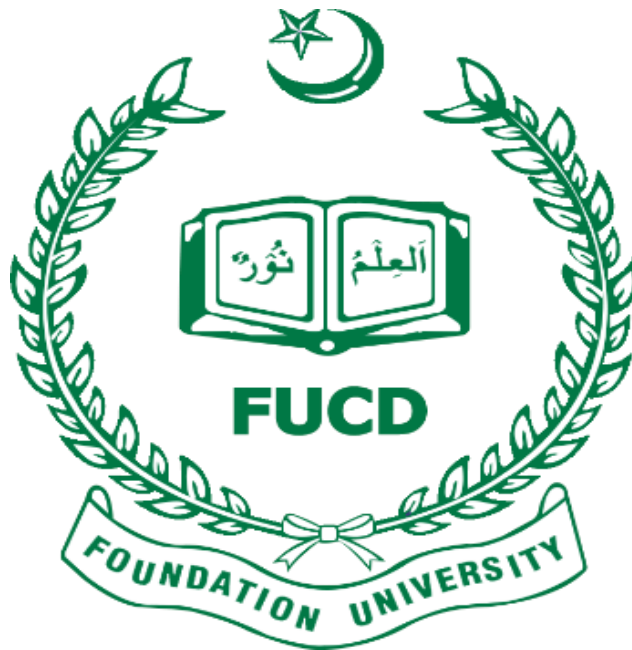


**FOUNDATION UNIVERSITY COLLEGE OF DENTISTRY
ISLAMABAD**



**STUDY GUIDE
ORAL BIOLOGY &
TOOTH MORPHOLOGY
1st YEAR BDS**

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MISSION OF THE DEPARTMENT

We aim to enable the undergraduate dentistry student in learning the foundational concepts and knowledge of oral biology which are essential to various components of dentistry, using innovative teaching and learning methods, and a hands-on approach. An interdisciplinary approach incorporating elements of other disciplines from 1st year BDS program will enable the student to make sense of and utilize the knowledge gained across the subjects.

Learning Outcomes of the Course of Oral Biology

Upon completion of the course, the student of 1st Year BDS will:

- Have a clear understanding of anatomy of oral structures, tissues and associated normal physiological processes.
- Be able to recall histological features of oral tissues.
- Be able to prepare and identify histological sections of oral tissues based on knowledge of oral histology and practice of laboratory techniques.
- Be able to identify and compare different types of dentitions and individual teeth, and their morphological features.

FACULTY OF DEPARTMENT OF ORAL BIOLOGY

Head of department:

Faculty

Dr. Ammar Abdullah Malik (BDS, Mphil) Asst. Prof

Demonstrator Dr. Amna Imran Fazal

Demonstrator Dr Farah Qasim

Teaching and learning methodologies

Teaching and learning methods are primarily focused more on promoting active learning through active participation of the learner. Actively learning students take charge of their own learning, actively seeking guidance and performance feedback from tutors, and routinely conducting self-assessment of their own learning needs.

Teaching and learning modalities

Large Group Interactive Sessions (LGIS)

Small Group Interactive Sessions (SGIS)

Self-Directed Learning (SDL)

Following teaching modalities may be used for small group teaching:

1. Video demonstrations
2. Students' presentations
3. Discussions
4. Peer learning
5. Projects/ Assignments

Learning Resources:

"Tencate's Oral Histology" by Antonio Nanci

"Concise Dental Anatomy and tooth morphology" by James Fuller

DETAILED LEARNING OBJECTIVES

Contents	Learning Objectives Students will be able to:	Teaching & Learning Methods	Assessment
1. Development of Oro-dental tissue: i. General Embryology Development of Face, palate, jaw (mandible, maxilla) tongue & lip.	a. Describe briefly the development of face, Palate, jaw (mandible, maxilla), Tongue, and lip with applied aspects. b. Describe Germ cell formation and fertilization, formation of three layered embryos, formation of the neural crest and fate of the germ cell.	LGIS SDL	SEQs MCQs OSPE
ii. Physiologic tooth movement, eruption & shedding.	a. Describe pre-eruptive, eruptive, post-eruptive tooth movement, cells & pattern of shedding. b. Describe orthodontic tooth movement.	LGIS	SEQs MCQs
iii. Development of tooth and its supporting tissue.	a. Describe primary epithelial band b. Describe dental lamina and its different stages, formation of the permanent dentition, hard tissue formation and the crown stage.	LGIS	SEQs MCQs OSPE
2. Tooth Morphology: Introduction i. Definition of terms used in dentistry	a. Define terms associated with dental morphology	Lab Demonstration SGIS SDL	SEQs MCQs
i. Human dentition, stages of dentition, dental formula, notation	a. Describe types of dentition. b. State the dental formula c. Apply the different methods of notation	Lab Demonstration SGIS SDL	SEQs MCQs

Contents	Learning Objectives Students will be able to:	Teaching & Learning Methods	Assessment
ii. Tooth surfaces their junction, line angles & point angles. iii. Contact area embrasures & clinical significance.	a. Identify the various aspects of the tooth surface, junctions and angles. b. Define contact area c. Define embrasure d. Describe clinical significance of the contact area and embrasures.	Lab Demonstration SGIS SDL	SEQs MCQs OSPE
3. Morphology of individual permanent and deciduous teeth i) Identification of individual tooth. ii) Variation & anomalies commonly seen.	a. Identify individual permanent/ deciduous tooth b. Describe tooth morphology with the help of models & specimens c. Estimate age from plaster casts by pattern of teeth eruption.	Lab Demonstration SGIS SDL	SEQs MCQs OSPE
4. Occlusion i) Factors influencing occlusion. ii) Introduction & classification of malocclusion.	a. Classify occlusion b. Describe the various relations which makeup normal occlusion. c. Explain the clinical significance of normal occlusion. d. Describe factors influencing occlusion: - Inclination of individual tooth. - Compensatory curves. e. Discuss clinical significance of centric relation & centric occlusion. f. Describe types of malocclusions in anterior and posterior teeth.	LGIS SGIS	SEQs MCQs
Histology of Oro-dental tissue: i) Enamel. Investing organic layers on enamel surfaces.	Describe: a. Amelogenesis b. Enamel prisms & crystals. c. Incremental lines, Hunter-Schreger bands d. The enamel-dentine junction. e. The surface features of enamels. f. Pre-eruptive investing layers. g. Investing layers associated with the crowns of erupted teeth.	LGIS SGIS	SEQs MCQs OSPE

Contents	Learning Objectives Students will be able to:	Teaching & Learning Methods	Assessment
ii) Dentine	Describe: a. Physical & chemical properties of dentine. b. dentinogenesis c. Dentinal tubules, Peritubular dentin, Intertubular dentin, Predentin, Odontoblast process d. Primary dentin, secondary dentin, Tertiary dentin, Incremental lines, Interglobular dentin, Granular layer. e. Innervation of dentin and clinical significance & considerations.	LGIS SGIS	SEQs MCQs OSPE
iii) Dental Pulp	Describe: a. Development of pulp b. Cells of dental pulp c. Fibers & ground substance of dental pulp d. Blood supply of the dental pulp e. Innervation of dental pulp	LGIS SGIS	SEQs MCQs OSPE
iv) Cementum	Describe: a. Cementogenesis b. Classification of cementum. c. The ultrastructural appearance of cementum. d. Resorption & repair of cementum	LGIS SGIS	SEQs MCQs OSPE
v) Periodontal Ligament	Describe following aspects of Periodontal Ligament (PDL): a) Cells & extracellular substance of PDL b) fibers of PDL c) Ground substance of PDL d) Blood vessels & nerves of the PDL e) Periodontal ligaments as a special connective tissue. f) The tooth support mechanism	LGIS SGIS	SEQs MCQs OSPE
vi) Alveolar Bone	Describe: a) Gross bone histology b) Bone cells c) Bone development d) Bone turnover	LGIS	SEQs MCQs OSPE
vii) Oral Mucosa	Describe: a) The epithelium. b) The Lamina propria.	LGIS SGIS	SEQs MCQs OSPE

Contents	Learning Objectives Students will be able to:	Teaching & Learning Methods	Assessment
	c) Epithelial-connective tissue interface. Discuss the regional variations in the structure of the oral mucosa.		
viii) The Salivary Gland.	a) Classify salivary glands b) Describe the structural pattern of salivary glands c) Elaborate on the composition of saliva	LGIS SGIS	SEQs MCQs OSPE
ix) Temporo Mandibular Joint (TMJ)	Describe a) Anatomical features of the TMJ b) Histological features of the TMJ c) Explain the clinical considerations associated with the TMJ.	SGIS	SEQs MCQs OSPE
6. The vasculature & innervation of the mouth (Macroscopic anatomy of the oral cavity)	Describe a) Blood supply b) Venous drainage c) Lymphatic drainage d) Innervation of oro-dental tissues.	LGIS SGIS	SEQs MCQs OSPE
7. Age – related changes in oro-dental tissues: i) Enamel ii) Dentine iii) Periodontal ligaments iv) Cementum v) Alveolus vi) Epithelial attachment vii) T.M.J viii) Oral mucosa ix) Cytoskeleton and Cell Junctions x) Fibroblast and Extracellular Matrix	a) Illustrate the changes in form & structure of the tooth jaw & oral tissues that occur with the advancement of age. b) Correlate age-related changes with function. c) Correlate age related changes among different tissues d) Describe age related changes in oral tissues e) Identify age associated changes in oral tissues	LGIS SGIS SDL	SEQs MCQs OSCE

PRACTICALS:

Contents	Learning Objectives Students will be able to:	Teaching & Learning Method	Assessment
1. Anatomic terminologies of Teeth	Differentiate between various terms used to explain teeth in detail and categorize them physiologically	Lab Demonstration	OSPE
2. Maxillary Central Incisors	<ul style="list-style-type: none"> a. Identify general characteristics and draw developmental table of maxillary central incisor b. Recognize all morphological aspects of maxillary central incisor c. Identify and enlist common anomalies seen in maxillary central incisors 	Lab Demonstration	OSPE
3. Maxillary Lateral Incisors	<ul style="list-style-type: none"> a. Identify general characteristics and draw developmental table of maxillary lateral incisor b. Recognize all morphological aspects of maxillary lateral incisor c. Identify and enlist common anomalies seen in maxillary lateral incisors 	Lab Demonstration SDL	OSPE
4. Mandibular Central Incisors	<ul style="list-style-type: none"> a. Identify general characteristics and draw developmental table of mandibular central incisors b. Recognize all morphological aspects of mandibular central incisors c. Identify and enlist common anomalies seen in mandibular central incisors 	Lab Demonstration	OSPE

<p>5. Mandibular Lateral Incisors</p>	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of mandibular lateral incisors b. Recognize all morphological aspects of mandibular lateral incisors c. Identify and enlist common anomalies seen in mandibular lateral incisors 	<p>Lab Demonstration</p>	<p>OSPE</p>
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6. Maxillary Canines	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of maxillary canines b. Recognize all morphological aspects of maxillary canines c. Identify and enlist common anomalies seen in maxillary canines 	Lab Demonstration	OSPE
7. Mandibular Canines	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of mandibular canines b. Recognize all morphological aspects of mandibular canines c. Identify and enlist common anomalies seen in mandibular canines 	Lab Demonstration	OSPE
8. Maxillary First Premolars	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of maxillary first premolars b. Recognize all morphological aspects of maxillary first premolars c. Identify and enlist common anomalies seen in maxillary first premolars 	Lab Demonstration	OSPE
9. Maxillary Second Premolars	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of maxillary second premolars b. Recognize all morphological aspects of maxillary second premolars c. Identify and enlist common anomalies seen in maxillary second premolars 	Lab Demonstration	OSPE
10. Mandibular First Premolars	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of mandibular first premolars b. Recognize all morphological aspects of mandibular first premolar c. Identify and enlist common anomalies seen in mandibular first premolars 	Lab Demonstration	OSPE

11. Mandibular Second Premolars	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of mandibular second premolars b. Recognize all morphological aspects of mandibular second premolars c. Identify and enlist different cusp types and common anomalies seen in mandibular second premolars 	Lab Demonstration	OSPE
12. Maxillary First Molars	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of maxillary first molars b. Recognize all morphological aspects of maxillary first molars c. Identify and enlist common anomalies and variations seen in maxillary first molars 	Lab Demonstration	OSPE
13. Maxillary Second Molars	<ul style="list-style-type: none"> d. Identify general characteristics and developmental table of maxillary second molars e. Recognize all morphological aspects of maxillary second molars d. Identify and enlist common anomalies and variations seen in maxillary second molars 	Lab Demonstration	OSPE
14. Maxillary Third Molars	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of maxillary third molars b. Recognize all morphological aspects of maxillary third molars c. Identify and enlist common anomalies and variations seen in maxillary third molars 	Lab Demonstration SDL	OSPE
15. Mandibular First Molars	<ul style="list-style-type: none"> a. Identify general characteristics and developmental table of mandibular first molars b. Recognize all morphological aspects of mandibular first molars 	Lab Demonstration	OSPE

	c. Identify and enlist common anomalies and variations seen in mandibular first molars		
16. Mandibular Second Molars	a. Identify general characteristics and developmental table of mandibular second molars b. Recognize all morphological aspects of mandibular second molars c. Identify and enlist common anomalies and variations seen in mandibular second molars	Lab Demonstration	OSPE
17. Mandibular Third Molars	a. Identify general characteristics and developmental table of mandibular third molars b. Recognize all morphological aspects of mandibular third molars c. Identify and enlist common anomalies and variations seen in mandibular third molars	Lab Demonstration	OSPE
18. Types of epithelium	Identify different types of epithelium on histological slides	Lab Demonstration	OSPE
19. Tooth Development	Identify different stages of tooth development on histological slides	Lab Demonstration	OSPE
20. Bone	Identify different types of bone lamellae	Lab Demonstration	OSPE
21. Structural and organizational features of enamel	Identify different histological features of enamel i.e. Cross striations, rod interrelationship, gnarled enamel, DEJ on histological slides	Lab Demonstration	OSPE
22. Histology of dentin	Identify various histological features present in dentin i.e. dentinal tubule, sclerotic dentin, inter tubular dentin, inter globular dentin, growth lines on histological slides	Lab Demonstration	OSPE
23. Pulp	Identify zones of pulp on histological slide	Lab Demonstration	OSPE

24. Periodontal ligament	Identify and enlist the fibers of PDL	Lab Demonstration	OSPE
25. Oral Mucosa	<ul style="list-style-type: none"> a. Identify different types of oral mucosa on histological slides b. Identify different types of papillae on histological slides 	Lab Demonstration	OSPE
26. Salivary Glands	Identify mucous and serous acini on histological slides	Lab Demonstration	OSPE
27. Temporo-mandibular Joint	Identify different histologic features of temporomandibular joint ie. articular disc, joint cavities, articular eminence	Lab Demonstration	OSPE

BDS FIRST PROFESSIONAL EXAMINATION
ORAL BIOLOGY AND TOOTH MORPHOLOGY
MARKS DISTRIBUTION

THEORY MARKS DISTRIBUTION:

Total Marks of MCQs = 40 Marks

Total Marks of SEQs = 50 Marks (10 SEQs of 5 Marks each)

Internal Assessment: 10 Marks

Total Marks of Theory: 100 Marks

PRACTICAL MARKS DISTRIBUTION:

Total Marks of OSPE = 40 Marks

Total Marks of Viva = 50 Marks (25 Marks Internal Examiner, 25 Marks External Examiner)

Internal Assessment: 10 Marks

Total Marks of Viva: 100 Mark

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