

El Paso Community College

Syllabus

Part II

Official Course Description

SUBJECT AREA	<u>Dental Assisting</u>
COURSE RUBRIC AND NUMBER	<u>DNTA 1311</u>
COURSE TITLE	<u>Dental Science</u>
COURSE CREDIT HOURS	<u>3 3 : 1</u> Credits Lec. Lab

I. Catalog Description

Emphasizes anatomical systems on the head and neck anatomy. Includes topics on the physiology, morphology, and embryology of the deciduous and the permanent teeth along with basic dental terminology. A grade of "C" or better is required in the course to take the next course. **(3:1). Lab Fee.**

II. Course Objectives

Part I. Histology and Embryology

A. Unit I: Development and Structure of Cells

1. Define histology and tissue.
2. Name the two main structures that comprise the cell.
3. List four structures found in the cytoplasm and describe the function of each.
4. Name two types of cell divisions and describe the purpose of each type of division.
5. Name the three periods that occur during pre-natal development and the length of time each of these periods cover.
6. List the three main events that occur during the proliferative phase of pre-natal development.
7. List the three main events that occur during the embryonic stage of development.
8. Describe what happens to the fetus during the fetal stage of development.
9. Describe the development of the embryonic disc and name the three "derm" tissues that make up this disc.
10. Name two tissues that originate from ectoderm.
11. Name two tissues that originate from the mesoderm.
12. Describe what "derm" layers the teeth are derived from.

B. Unit II: Structure and Function of the Cells, Tissues, and Organs

1. List the four basic tissue types and state the basic function of each type.
2. State where epithelial tissue is found in the body.
3. List four broad classifications for connective tissue.
4. Name the three types of cartilage and where in the body each type is found.
5. Name the two types of bone, describe them and state where they are found.
6. Name the main cells found in blood and describe the function of the blood and lymph.
7. Name the two principle types of nerve cells and state the function of each.
8. Name the three parts of a neuron and the describe function of each part.
9. Locate and describe the function of the myelin sheath and the sheath of Schwann.
10. Name the three types of muscle cells and state where they are found in the body.

C. Unit III: Oral Embryology

1. Describe the development of the palatal processes of the maxilla and their fusion with the premaxilla.

2. Describe the developmental defects that lead to facial clefts and palatal clefts.

D. Unit IV: Development of the Teeth and Periodontium

1. Describe each of the following structures: dental lamina, tooth germ, bud stage, cap stage, bell stage, dental papilla, enamel organ, dental sac, and the successional dental lamina.
2. Define amelogenesis and name the cell that produces enamel and the tissue that this cell is derived from.
3. Describe the enamel maturation process.

E. Unit V: Eruption and Exfoliation of the Teeth

1. Explain what is meant by the eruptive process as it pertains to the teeth.
2. Name the three stages of eruption.
3. Name the part of the tooth that starts to develop during the pre-eruptive stage of tooth eruption.
4. Give the approximate time it takes for primary and/or permanent teeth to complete root formation.
5. Describe the movement of the developing tooth buds of permanent incisors and premolars as the maxilla and mandible grow away from the brain case and tell at what stage of development this movement occurs.
6. Describe what happens to the primary tooth root when the permanent successor erupts.
7. Describe the following terms and explain how they relate to the eruption and exfoliation of teeth: retarded eruption, premature eruption, submerged or any loosed teeth, and supra-eruption.

F. Unit VI: Enamel

1. Describe enamel as to color, hardness, composition and percentage mineralization.
2. Give the degree of calcification for each of the following parts of enamel: the enamel rod or enamel prism and the enamel rod sheath or prismatic sheath.
3. Identify and describe: striae of Retzius or neonatal line, incremental lines, imbrication lines, perikymata, enamel lamellae, enamel tufts, enamel spindles, and the dentinoenamel junction.

G. Unit VII: Dentin

1. Compare the color, composition and hardness of dentin to enamel.
2. Identify and describe: dentinal fibers, dentinal tubules, predentin, incremental lines, neonatal line.
3. List the three types of dentin that can be found in a tooth.
4. Describe the difference between sclerotic dentin and dead tracts.
5. Explain the association between the sensation of pain and the dentinal tubules.

H. Unit VIII: Dental Pulp

1. Describe what type of tissue the dental pulp is made of.
2. Name the two main parts of the dental pulp and the chambers within the tooth they fill.
3. Describe the variations in the radicular portion of the pulp.
4. Describe and give the function of the following pulpal cells: odontoblast, fibroblast, macrophage, and undifferentiated cell of the pulp.
5. Describe the following calcifications that are found in the pulp: diffuse calcification and the three types of pulp stones.

I. Unit IX: Cementum

1. Name the two types of cementum that are found on the root surface and describe the origin of each type.
2. Compare cellular cementum to bone as to hardness and degree of mineralization.
3. Describe Sharpey's fibers and tell how they contribute to cementum function.
4. Describe hypercementosis and explain where it most commonly is found.
5. Describe how cementum can be resorbed and repaired and differentiate between anatomic repair and functional repair.

J. Unit X: Periodontium: Periodontal Ligament

1. Locate the periodontal ligament and name the organ that it is derived from.
2. List the two main groups of fibers found in the periodontium.
3. Name the one fiber in each group that is only attached to cementum.
4. Name the gingival fiber that is not attached to either bone or cementum.

K. Unit XI: Periodontium, Alveolar Process and Cementum

1. Define the term periodontium and name the four tissues that are involved in this organ.
2. Describe the functions of the following cells within the periodontium: fibroblast, cementoblast, osteoblast, osteoclast and macrophage.
3. Describe the anatomical configuration of the supporting compact bone using the following terms: Haversian bone, Haversian canals, lacuna, canaliculi, and Volkmann's canals.
4. Explain how both resorption or apposition of bone and/or cementum occur during tooth movement or during function; include how pressure and tension effects these processes.
5. Describe what happens to the alveolar bone and cementum during the aging process or following extractions.

L. Unit XII: Oral Mucosa

1. Name the type of epithelium that lines the oral cavity.
2. Locate and describe the following components of oral epithelial tissues: epithelium, basement membrane, lamina propria and submucosa.
3. Describe the two parts of the lamina propria.
4. List the contents of the submucosa.
5. List three types of oral mucosa and tell where each type is found.
6. Describe where the submucosa is located histologically and describe it.
7. Name and locate the three strata of epithelial cells that are found in the lining epithelium.
8. Name five areas where lining mucosa is found.

M. Unit XIII: Salivary Glands & Tonsils

1. Name the two general classifications of salivary glands and describe how the secretions for each type enter the oral cavity.
2. Name the three types of salivary gland secretions.
3. Describe the difference between serous and mucous secretions.
4. Locate the three pairs of major salivary glands and classify them by their type of secretion.
5. Locate the five groups a minor salivary glands.
6. Name, by location, the various types of secretions of the minor salivary glands.
7. List six functions for saliva.

Part II Oral Anatomy

3 Unit XIV: Dental Terminology- Introduction to Oral Anatomy

1. Locate the following regions of the face: lips and cheeks, chin, infraorbital and supraorbital regions, glabella, nasion and gonion, ala of the nose and the nares, and inner and outer canthus of the eye, and tragus of the ear.
2. Locate the entrance and exit to the oral cavity.
3. Locate the boundaries of the oral cavity.
4. Name the two body systems that the oral cavity can be considered part of.
5. Name the two jaws found within the oral cavity
6. Name five functions of the oral cavity.
7. Describe the type of epithelium found on each surface of the lips, and locate the following parts of the lip, the philtrum, commissure, and vermillion border.
8. Name and locate the two divisions of the oral cavity.
9. Locate the anterior, lateral, and medial borders of the vestibule.
10. Name the bone and fold found on the posterior border of the vestibule.
11. Name the structures found on each end of the ligament located on the posterior boundary of the vestibule.
12. Locate the mucobuccal and mucolabial folds and explain why the name changes as you proceed from the anterior to posterior of the mouth.
13. Locate the alveolar process (ridge) and name the main function of this ridge.
14. Locate the mucogingival junction on the alveolar ridge.
15. Describe the differences between the mucosa located on each side of the mucogingival junctions.

16. Name the mucosa on the tooth side of the mucogingival junction and name the three parts of this tissue.
17. Locate the free gingival groove, the gingival sulcus or crevice, and the crest or margin of the gingiva.
18. Locate the cheeks and describe the inner and outer surfaces covering the cheeks.
19. Locate the frenoli found in the vestibule and describe what is their function.
20. Locate the opening of the and parotid gland that is found in the vestibule.
21. Name the opening to the parotid papilla.
22. Describe Fordyce's granules and explain why they are not considered a "normal" occupant of the buccal mucosa.
23. Name the bony growths frequently found on the alveolar ridge.
24. Name the two anatomic divisions of the roof or of the mouth and locate the following structures: incisive papilla, palatine rugae, fovea palatini and uvula.
25. Name the bony growth frequently found in the midline of the hard palate.
26. Locate the posterior fauces of the oral cavity and name the two arches or pillars that occur on either side of the posterior fauces.
27. Name the anatomic structure found between the two arches or pillars.
28. Name and locate the four types of papillae found on the tongue.
29. Name and locate the two parts of the tongue.
30. Locate the epiglottis, the foramen caecum, terminal sulcus, and the lingual tonsils.
31. Locate the following structures found in the floor of the mouth: lingual frenum, sublingual fold, sublingual (salivary) papilla (or caruncles), Wharton's ducts, and the ducts of Bartholin.
32. Name the bony growth frequently found on the lingual surface of the mandible.

4 Unit XV: The Dentition

1. Name and locate the three hard tissues and one soft tissue that make up the tooth.
2. Name and locate the three junctions between the hard tissues of the teeth.
3. Compare the three hard tissues as to color and hardness.
4. Identify the cervical line of a tooth, name the junction it represents; and name the part of the tooth found on either side of this line.
5. Describe what is meant by the eruption of a tooth.
6. Name the tissue that covers the anatomic crown and the tissue that covers the anatomic root of a tooth and explain what is the difference between an anatomic crown or root and a clinical crown or root.
7. Explain what is meant by an anterior tooth and what is meant by a posterior tooth.
8. Name and locate the four surfaces and the edge or ridge found on the anterior teeth.
9. Locate and name the five surfaces found on posterior teeth.
10. Explain why the mesial and distal surfaces are also known as the proximal surfaces.
11. Explain why a mesial-proximal surface always touches a distal-proximal surface except in the center of the mouth and at the distal surface of the last tooth.
12. Describe how the tooth surfaces are divided into thirds and named to facilitate locating an exact spot on the tooth.
13. Locate line angles and point angles on the teeth.
14. Describe or define the following terms as they apply to the teeth: cusp and cusp slope, cingulum, lobe, developmental and supplemental groove, fossa or concavity, pits and fissures, tubercle, and mamelon.
15. Locate the following ridges on the teeth and identify which teeth have which ridges: labial, , oblique, and mesial and distal marginal ridges.
16. Explain what is the difference between an open contact and a diastema.
17. Locate and describe the contact point, contact area.
18. Locate the interproximal space and tell what normally fills this space in a healthy mouth.
20. Locate the following embrasures: incisal, occlusal, facial, lingual, and cervical or gingival.
21. Locate the facial and lingual contours, and the crest of curvature on a tooth.
22. Tell where the crest of curvature is normally found on the buccal and lingual surfaces.
Describe the function of the embrasures and crest of cervical curvature for maintaining a healthy dentition.
23. Name and describe the three possible variations in root forms of a tooth.
24. Locate and describe the root trunk.
25. Locate the pulp cavity and tell what occupies this space in a vital tooth.
26. Name and locate the two major parts of the pulp cavity.
27. Locate the pulp horns.
28. Locate the apical foramen and describe the variations that can occur in this structure.
29. Describe what is meant by the term dental arch and give the scientific name for each dental arch.

30. Explain what is meant by the dentition.
31. Describe what is meant by: primary, mixed and permanent dentition and tell at what ages each type of dentition is normally found in the mouth.
32. Name the four types of permanent teeth and tell which ones are considered anterior teeth and which ones are considered posterior teeth.
33. Name the three types of primary teeth.
34. Name the individual teeth in both the permanent and primary dentition.
35. Identify both the primary and permanent teeth using the Universal Identification, Palmer and FDI System.
36. Describe how the dentition is divided into quadrants.
37. Compare the number of teeth found in a quadrant of primary teeth with that of a quadrant of permanent.
38. Explain why only the permanent anterior and bicuspid teeth are considered succedaneous teeth.
39. Give another name (synonym) for each of the following terms: primary dentition, cuspid, and bicuspid and a term that can be used for either labial or buccal.

5 Unit XVI: Physiology of the Dentition; Normal Occlusion – Malocclusion

1. Define alignment and malalignment as it pertains to the teeth.
2. Describe four deviations from ideal alignment of the teeth.
3. Define occlusion and malocclusion.
4. Review the relationship of the teeth in the maxillary arch to those in the mandibular arch when the teeth are in occlusion and the alignment is normal.
5. Review or describe the following terms: Vertical relation, freeway space over closure, overjet, overbite, cross bite and open bite, and centric relation, centric occlusion, functional movements & parafunctional movements.
6. Review the classification of occlusion and malocclusion using the following terms and classifications: ideal occlusion, Angle's classification for dental relationship, and Lischer's classification for jaw relationships.
7. Define the following terms: curve of Wilson, and curve of Spee.
8. Explain the movements of the mandible during the act of mastication.

6 Unit XVII: The Morphology of Individual Teeth

1. Describe the characteristics of each of the permanent teeth.
2. Compare the morphology and function of anterior teeth with that of posterior teeth.
3. Describe in detail the root morphology of all secondary teeth.
4. Tell the number and location of the pulp canals normally found in each of the teeth.

7 Unit XVIII: Dental Anomalies

1. Define the term dental anomalies.
2. Identify the teeth most frequently missing in order of occurrence.
3. Identify the teeth most frequently showing variation in form.
4. Identify the areas in the mouth where supernumerary teeth most frequently occur in order of this occurrence.
5. List, in order, the frequency of occurrence of supernumerary teeth.

8 Unit XIX: Head and Neck Anatomy – Skull

1. Explain what the difference is between the neurocranium and the viscerocranium.
2. Name and identify the eight bones that make up the neurocranium and the fourteen bones that make up the viscerocranium and tell which bones are paired and which ones are unpaired.
3. Locate the cortical plates and medullary parts of a bone.
4. Describe the differences between a foramen, bony canal, and a fissure.
5. Identify all of the bones of the skull that can be seen on the anterior view of the skull to include the bones that are visible in the orbit and nasal cavity.
6. Identify all of the landmarks that can be seen on the anterior view of the skull.
7. Identify all of the bones of the skull that can be seen on the lateral view of the skull.
7. Locate the zygomatic arch and identify the two processes that make up this arch.
9. Identify all of the landmarks that can be seen on the lateral view of the skull.

10. Name the bone that supports the teeth.
11. Identify the only freely movable bone in the skull and state whether it is paired or unpaired.
12. Name the two major parts of the mandible.
13. Identify the following parts of the ramus of the mandible: angle, condylar process and condyle, coronoid process, mandibular notch (also sigmoid or semilunar notch), mandibular (inferior alveolar) foramen, and the lingula. Identify on a skull in the laboratory).
14. Identify the following parts of the body of the mandible: mental protuberance, alveolar process, mental foramen, external and internal oblique, sublingual and submandibular fossae, retromolar triangle, and the genial tubercles. (Identify on a skull in the laboratory).
15. Locate the maxilla, and state whether it is paired or unpaired.
16. Locate and describe the body and the four processes of the maxilla.
17. Identify the following parts or landmarks on the maxilla: anterior nasal spine, canine eminence, canine fossa, maxillary sinus, infraorbital foramen, maxillary tuberosity, nasopalatine or incisive foramen, and median palatine suture.
18. Identify the bones and landmarks seen through the anterior view of the nasal aperture.
19. Identify the cartilage, bones seen in the midsagittal section at the lateral wall of the nasal cavity.
20. Identify the structures and bones seen in a sagittal section at the lateral wall of the nasal cavity.
21. Locate the opening between the maxillary sinus and the nasal sinus in the lateral wall of the nasal cavity and note how infections could spread through this opening.
22. Name and locate the four paranasal sinuses and describe the functions of these sinuses.

9 Unit XX: Human Musculature and Muscles of the Head and Neck

1. Review what the origin, insertion and action of a muscle means.
2. Name the four pairs of muscles of mastication, and give the origin, insertion and action of each.
3. List the muscles responsible for each of the following movements of the mandible: elevation, depression, lateral movement, protrusion, and retrusion.
4. Describe which groups of muscles are responsible for the movement of the lips and cheeks and for the facial expression.

10 Unit XXI: Temporomandibular Joint

1. Locate, on a skull, each of the following components of the temporomandibular joint (TMJ): mandibular (glenoid) fossa; articular tubercle; mandibular condyle; articular (capsular) ligament; articular disk or meniscus; temporomandibular, sphenomandibular, and stylomandibular ligaments; and the external pterygoid muscle attachments.
2. Describe the articular disk, describe where it is located when the mandible is at rest, and its movement during the various movements of the joint.
3. Describe the two types of movements that the temporomandibular joint capable of performing.
4. Describe what happens during subluxation (dislocation) of the TMJ.

11 Unit XXII: Head and Neck Anatomy; Cardiovascular System, Blood Vessels and Lymph Drainage

1. Trace a drop of blood through the circulation of the body.
2. Name and describe the functions of the chambers of the heart.
3. Describe the functions of the heart.
4. Name the two main divisions of the common carotid artery.
5. Name the area of the skull supplied by the internal carotid artery.
6. Know what area of the head each of the following branches of the external carotid artery supply blood to: lingual, maxillary, and the temporal arteries.
7. Name the branches of the maxillary artery that supply the maxillary teeth and palate.
8. Name the veins responsible for draining the various anatomic structures of the face.

12 Unit XXIII: Head and Neck Anatomy – Nerves and Techniques for Administering Local Anesthesia

1. Name the 12 cranial nerves. Describe whether they are afferent (sensory), efferent (motor) and mixed nerve fibers.
2. Describe the main purpose of local anesthesia and explain the difference between a block and infiltration anesthesia.
3. Name the teeth and gingiva innervated by the posterior superior, middle superior, and anterior superior alveolar nerves and describe the procedure for injecting local anesthetic to these areas.

4. Name the nerve that innervates the posterior portion of the palate including the posterior palatal gingiva and describe where to inject a local anesthetic to block the pain impulses in this area.
5. Name the nerve that innervates the anterior portion of the palate including the anterior palatal gingival and describe where to inject a local anesthetic to block pain impulses in this area.
6. Name the area of the face innervated by the motor branches of the Mandibular nerve.
7. Name the group of muscles innervated by the motor branches of the Mandibular nerve.
8. Name the branch of the mandibular nerve providing sensory innervation to the Mandibular teeth and facial gingiva and describe how to inject a block anesthetic to this nerve.
9. Name the nerve providing pain sensation to the tongue and lingual gingiva and describe the procedure for providing a block anesthetic to this area.
10. Name the nerve that supplies sensory innervation to the mucosa of the cheek and buccal gingiva in the second and third mandibular area, and then describe how the gingival area may be anesthetized.
11. Name the tissues that the terminal branches of the inferior alveolar nerve innervate and then describe where an anesthetic solution could be placed to provide anesthesia to this area.

13 Unit XXIV: Salivary Glands

Name and locate the three pairs of major salivary glands, their openings into the oral cavity, and the principle type of secretion for each gland.

Laboratory Section

A. Unit I: Oral Anatomy and Dental Anatomy

1. Identify oral anatomical structures on models.
2. Identify the supporting structures of the teeth.
3. Using the Universal Numbering System identify both primary and permanent teeth on models.
4. Identify the tissues of the tooth.
5. Identify tooth anatomical parts, surfaces, and contact.
6. Using correct terminology, locate any structure in the oral cavity.
7. Classify occlusion and malocclusion using both Angle's and Lascars method of classification on articulated models.

B. Unit II: Identification of Primary and Permanent Teeth

Identify by name any extracted tooth.

C. Unit III: Bones and Landmarks of the Skull

Identify the bones and anatomic landmarks on a skull.

III. THECB Learning Outcomes (WECM)

1. Describe anatomical systems in terms of components and functions.
2. Identify teeth and related structures.
3. Recognize oral structures and tooth nomenclature.
4. Explain the physiology and morphology of the deciduous/primary and the permanent/secondary teeth.

**IV. Evaluation
Progress Assessment**

Unit exams, skills competencies, assignments, and a comprehensive final will be announced on the course calendar. Quizzes may be administered at the instructor's discretion and will not appear on the course calendar. This course is designed to challenge the student. Reading of assigned articles, chapters of the class text, class lectures, and instructor handouts are necessary to pass this course. The lecture may not always follow the text.

Grading

This course is divided into three components: Histology & Embryology, Head & Neck Anatomy, and Laboratory. Each component is subject to the grading policies and classroom policies of its instructor. Each component will comprise one third of the final grade for the course.

1. Grading Scale

93 – 100	A
83 – 92	B
75 – 82	C
74 or below	F

2. Grade Distribution

Histology & Embryology	$\frac{1}{3}$ of final course grade
Head & Neck Anatomy	$\frac{1}{3}$ of final course grade
Laboratory	$\frac{1}{3}$ of final course grade

3. Histology & Embryology
 - a) There may be unannounced quizzes given at the beginning of each lecture period. The questions will come from the previous lecture. The quizzes will be averaged together and will make up 10% of the Histology & Embryology grade.

 - b) There will be three comprehensive examinations scheduled. A maximum of 50 minutes will be allotted for each.

 - c) There will be a comprehensive final exam scheduled, during finals week, for the Histology & Embryology portion of this course.

Remediation

Graded assignments will be returned to the student in a timely manner for the student's use in estimating his/her progress in the course. Additionally, the instructor will conduct periodic progress discussions with each student. However, it is the student's responsibility to schedule an individual conference with the instructor should either party feel that the student is not meeting at least the minimum passing standard for the course. The instructor may provide remediation opportunities which may include but are not limited to: supplemental assignments, reexamination, presentations, community projects, etc.

V. Disability Statement (Americans with Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.