El Paso Community College
Syllabus
Part II
Official Course Description

SUBJECT AREA	**Dental Assisting**
COURSE RUBRIC AND NUMBER	**DNTA 1301**
COURSE TITLE	**Dental Materials**
COURSE CREDIT HOURS	**3 2 : 3** **Credit Lec Lab**

I. Catalog Description

Presents the theory of the composition, properties, and procedures related to dental materials. Includes safety and American Dental Association regulated standard precautions practiced in the lab and classroom settings. A grade of "C" or better is required in this course to take the next course. **(2:3). Lab fee.**

II. Course Objectives

THEORY

A. Unit I. Introduction to Dental Materials

1. Discuss the overall goal of a course in dental materials and its importance in the education of the dental health care professional.
2. Discuss conditions that make the oral cavity a hostile environment.
3. Identify the characteristics or properties a dental material must possess to survive in the oral cavity.
4. Discuss the biocompatibility of dental materials.
5. Explain how organizations evaluate and/or classify dental drugs, materials, instruments, and equipment.
6. Name and discuss the categories into which dental materials are classified.
7. Discuss the importance of following the manufacturer’s instructions for the use of dental materials.
8. Describe or define the key words and phrases found in the text or in the lecture.

B. Unit II. Materials Science and Dentistry

1. Discuss the phases into which materials are classified.
2. Explain the basic differences between primary and secondary bonds.
3. Name the three types of primary bonds and describe the difference between them.
4. Contrast the bonding characteristics of metals, ceramics, plastics, and composites.
5. Describe or define the key words and phrases found in the text or in the lecture.

C. Unit III. Physical and Mechanical Properties of Dental Materials

1. Discuss the physical properties of dental materials.
2. Define wetting in reference to liquid and why a drop may or may not bead up on a surface.
3. Discuss the term and unit of measure for the following properties:

- density
- heat capacity
- coefficient of thermal expansion
- stress
- strain
- modules of elasticity

4. Define proportional limit and discuss other equivalent terms.
5. Name and discuss the four types of stress. Provide examples used in every day life.
6. Describe bending stress when dental materials are subjected.
7. Compare the properties of toughness and hardness. Provide examples used in every day life.
8. Discuss the differences between stress and creep.
9. Discuss stress concentration and how its effects a poorly placed amalgam.
10. Describe or define the key words and phrases found in the text or in the lecture.

D. Unit IV. Gypsum Materials

1. Discuss the major differences between dental plaster, stone, and improved stone.
2. Explain the meaning of initial and final setting times.
3. Discuss setting time of gypsum products.
4. Discuss wet and dry strength as it relates to gypsum products.
5. Discuss the recommended technique for the use of gypsum products in relation to measuring, mixing and pouring an impression.
6. Describe or define the key words and phrases found in the text or in the lecture.

E. Unit V. Impression Materials

1. Discuss the use of impression materials.
2. List the oral structures of which impressions are made.
3. Describe the various types of impression trays and their use.
4. Discuss the ideal qualities of an impression material.
5. Differentiate between:
   elastic and inelastic impression materials
   reversible and irreversible impression materials

6. Describe the composition and setting mechanism of the following:
   - wax and impression compounds
   - zinc oxide-eugenol (ZOE)
   - agar or reversible hydrocolloid
   - alginate
   - polysulfides
   - condensation silicones
   - polyethers
   - addition silicones
7. Compare the relative properties, use, and cost of the above impression materials.
8. Describe the effect of water temperature on the setting rate of alginate.
9. Describe the effect of water and heat on the setting rate of polysulfides.
10. Describe or define the key words and phrases found in the text or in the lecture.

F. Unit VI. Dental Cements

1. Describe the use of dental cements as a
   - luting agent
   - base
   - liner
   - restorative material

- temporary restoration
- intermediate restoration
- periodontal pack
- temporary cement
- cavity varnish

2. Explain the importance of adhesion and microleakage to the clinical use of a dental cement.
3. Discuss the difference between a base and liner.
4. Describe the use of a cavity varnish or cavity sealer.
5. Describe the properties of the component liquids and powders of dental cements.
6. Explain the setting reaction of a typical dental cement.
7. Based on the properties of the liquid and powder, discuss the properties of
   - ZOE
   - zinc phosphate cement
   - polycarboxylate cement
   - glass ionomer cement
   - calcium hydroxide
8. Discuss the mixing process for cements, bases, and liners.
9. Describe or define the key words and phrases found in the text or in the lecture.

G. Unit VII. Amalgam and Other Direct Metallic Restorative Materials

1. Differentiate between an amalgam alloy and a dental amalgam.
2. Discuss the principle of cavity preparation for an amalgam preparation.
3. Discuss the composition of conventional and high-copper dental amalgams.
4. Describe the function of the major elements of an dental amalgam.
5. Discuss the self-sealing properties of an amalgam.
6. Describe the following particle shapes:
   - lathe cut
   - spherical
   - blend or admix
7. Describe the effect of moisture contamination.
8. Explain the trituration and setting processes.
9. Describe the reactions involved in both conventional and high-copper amalgams
10. Discuss the composition, relative strength, and corrosion resistance for amalgam.
11. Discuss acceptable mercury hygiene practices.
12. Discuss the manipulation of dental amalgam.
13. Describe or define the key words and phrases found in the text or in the lecture.

H. Unit VIII. Adhesive Materials

1. Describe an adhesive material.
2. Explain the difference between micromechanical bonding and macromechanical bonding.
3. Discuss the benefits of restorations that ate bonded to tooth structure.
4. Compare the differences of the microanatomy of enamel and dentin regarding etching and bonding of the following:
   - ortho-phosphate acid
   - enamel tags
   - smear layer
   - primer
   - adhesive
5. Discuss the early fallacies about dentin bonding and how research has changed current practices.
6. Discuss the differences between glass ionomer cements and dentinal bonding agents.
7. Describe or define the key words and phrases found in the text or in the lecture.

I. Unit IX. Direct Polymeric Restorative Materials

1. Discuss the two types of polymerization reactions that are commonly seen in dental materials.
2. Discuss the following properties of restorative resins:
    - polymerization shrinkage
    - coefficient of thermal expansion
    - abrasion resistance
3. Discuss the relationship between the filler particle, the matrix, and the coupling agent of a composite restorative material.
4. Compare the advantage and disadvantages of light-cure and chemical-cure composite materials.
5. Discuss the importance of proper eye protection when light-curing dental materials.
6. Discuss the importance of the following procedures and/or characteristics of dental composites:
    - depth of cure
    - addition of material in increments
    - inhibition by air
    - unreacted C=C bonds
    - shades shortcomings of the matrix
7. Discuss the importance of the following properties in relation to the fillers found in dental composites:
    - composition
    - size
    - amount
    - abrasion resistance
    - refractive index
    - clinical detection
8. Discuss the use of dental composites in various dental settings and cavity preparations.
9. Discuss the rationale between flowable and condensable composites.
10. Discuss the use of composites for pit and fissure sealants.
11. Discuss preventative resin restoration and composite cements.
12. Discuss the characteristics of light-cure and chemical-cure ionomer cements.
13. Summarize the recommended guidelines for light curing dental materials.
14. Discuss the similarities between compomers, glass ionomers, and composites.
15. Describe or define the key words and phrases found in the text or in the lecture.

LABORATORY

Laboratory Assignments are composed of the topics:

1. Gypsum products to include:
    pouring of diagnostic models
    . trimming of diagnostic models
2. Impression materials including taking a diagnostic impression.
3. Dental cements, bases and liners
4. Amalgam restorative materials
5. Polymeric restorative materials
6. Infection control in the dental lab setting
7. Writing a laboratory prescription.

III. THECB Learning Outcomes (WECM)

1. Differentiate dental materials for specific procedures
2. Manipulate materials
3. Demonstrate the basic principles of laboratory safety, and comply with OSHA and other regulatory agencies' standards.

Revised by Discipline: Fall 2015 (next revision in 3 years)

IV. Evaluation

Progress Assessment
Unit examinations, 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.

Grade Distribution

Assignments	15%
Quizzes	15%
Skill Competencies	25%
Exams	20%
Final Exam	25%
	100%

Grading Scale

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

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, etc.

V. Disability Statement (American 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.