El Paso Community College
Syllabus
Part II
Official Course Description

SUBJECT AREA	**Dental Hygiene**
COURSE RUBRIC AND NUMBER	**DHYG 1219**
COURSE TITLE	**Dental Materials**
COURSE CREDIT HOURS	**2 2 : 1** **Credits Lec Lab**

I. Catalog Description

Studies the physical and chemical properties of dental materials including the application and manipulation of the various materials used in dentistry. A grade of "C" or better is required in this course to take the next course. **Prerequisites: BIOL 2401 and BIOL 2402 and CHEM 1306 and 1106. Corequisites: DHYG 1103 and DHYG 1201 and DHYG 1239 and DHYG 1304 and DHYG 1431. (2:1). 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. Explain how organizations evaluate and/or classify dental drugs, materials, instruments, and equipment.
5. Name and discuss the categories into which dental materials are classified.
6. 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. Discuss why correct dispensing, timing, and mixing of materials are important.
11. Discuss the difference in setting times of dental materials in the oral cavity and on the bracket tray.
12. 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 het on the setting rate of polysulfides.
10. Describe or define the key words and phrases found in the text or in the lecture.

E. Unit VI. Dental Cements

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

F. 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.

G. 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.

.H. Unit IX. Direct Polymeric (Esthetic) 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 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.

I. Unit X. Polishing and Abrasive Materials

1. Discuss the following terms:
   - cutting
   - abrasion
   - finishing
   - polishing
   - abrasive
2. Discuss uses of abrasives clinically or in laboratory procedures.
3. Summarize the factors that may influence the rate of abrasion and explain why the hygienist must have a clear understanding of these factors in the delivery of patient care.
4. Discuss the reasons that tooth structure and restorations are polished.
5. Discuss the polishing process, including the series of steps, scratches produced, and the wavelength of visible light.
6. Discuss selective polishing.
7. Discuss the characteristics of an acceptable prophylaxis paste.
8. Describe or define the key words and phrases found in the text or in the lecture.

J. Unit XI. Oral Appliances

1. List and discuss the reason for the use of the different types of oral appliances used in the dental profession.
2. Discuss the different thermoplastic materials used in the fabrication of oral appliances and discuss their properties.
3. Explain the steps involved in fabricating an oral appliance.
4. Discuss the proper maintenance of oral appliances.
5. Describe or define the key words and phrases found in the text or in the lecture.

K. Unit XII. Tooth Bleaching

1. Define tooth bleaching and explain the difference between vital and nonvital tooth bleaching.
2. Discuss the difference between intrinsic and extrinsic stain and give examples of each.
3. Name chemical agents used for vital tooth bleaching, and explain the process by which bleaching agents bleach teeth.
4. List the factors that affect the success of tooth bleaching.
5. Contrast patient applied and professionally applied vital bleaching.
6. Describe or define the key words and phrases found in the text or in the lecture.

L. Unit XIII. Fixed Indirect Restorations and Prostheses

1. Discuss fixed indirect restorations and factors that affect treatment planning.
2. Discuss the advantages and disadvantages of all-metal, ceramometal, and all-ceramic restorations.
3. Discuss the lost wax casting technique used to fabricate metal restorations.
4. Describe the types of alloys used to fabricate all metal crowns, ceramometal crowns, and partial denture frameworks.
5. Discuss the types of porcelain used to simulate tooth color.
6. Describe or define the key words and phrases found in the text or in the lecture.

M. Unit XIV. Removable Prostheses and acrylic resins

1. Discuss the use of acrylic resins in dentistry maintaining.
2. Explain the physical and chemical stages of polymerization of acrylic resins.
3. Discuss the function of the components of heat-cure and cold-cure acrylic resin systems.
4. Describe the steps involved in the construction of a denture.
5. Summarize the procedures used to reline a denture.
6. Describe or define the key words and phrases found in the text or in the lecture.

N. Unit XV. Detection and Management of Restorative Materials during Scaling and Polishing

1. Distinguish between porcelain and composite restorations.
2. Distinguish between tooth tissue and restorative materials
3. Describe or define the key words and phrases found in the text or in the lecture.

LABORATORY

1. Laboratory Assignments are composed of the topics:

- Gypsum products
- Impression materials
- Dental cements, bases and liners
- Amalgam restorative materials
- Polymeric restorative materials
- Oral appliances
- Tooth bleaching
- Infection control in the dental lab setting

III. THECB Learning Outcomes (WECM)

1. Differentiate between the various types of dental materials and their respective properties.
2. Manipulate materials used in dentistry.

IV. Evaluation

A. Condition of Performance:

1. Theory - 80% of final grade.

a. Assessment: There will be 6 written exams based upon lecture, and cognitive objectives stated in each unit, and reading assignments and a final exam. Pre and post quizzes will be announced and unannounced. Scores from all quizzes will be averaged and added as one major exam at the end of the term.

b. Students must be prepared for class discussion prior to class and laboratory

2. Laboratory - 20%

There will be pass/fail evaluations given at the end of each unit based on a 100% average for the final laboratory grade

Grading Scale

A = 100 - 93
B = 92 - 83
C = 82 – 75
F = 74 and below

This course must be passed with a "C" to continue in the Dental Hygiene Program.
Grades will be rounded to the next highest grade.

Remediation

The instructor will provide individual procedures for students needing remediation. Unexcused absences may result in a grade reduction or no retake of exams. Such procedures will be discussed with the student(s) and assignments will be provided.

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.