COURSE SYLLABUS

TITLE: DENTAL MATERIALS

PROGRAM COURSE NUMBER: DHYG 1319 CREDIT HOURS: 3

LECTURE HOURS: 2 LAB HOURS: 3 CONTACT HOURS: 80

PREREQUISITE (S): Successful completion of 2nd semester of Dental Hygiene Program

PROGRAM RESPONSIBLE FOR SYLLABUS MAINTENANCE: Dental Hygiene

PREPARED/REVISED BY: Dr. Robert Bennett DATE: 04.12.14 (Instructor)

REVIEWED BY: Raquel Rico DATE: 04.12.14 (Department Chair)

APPROVED BY: Jean Lashbrook DATE: 04.12.14 (Division Director)
COURSE NUMBER AND TITLE: DHYG 1319: Dental Materials

COURSE (CATALOG) DESCRIPTION:

The study of dental materials including the physical and chemical properties and applications of the various materials used in dentistry. Student experiences include the manipulation of dental materials in the lab setting.

STUDENT LEARNING OUTCOMES

At the end of this course, the student will be able to:

1. Discuss appropriate applications for commonly used dental materials.
2. Describe the physical and chemical properties of commonly used dental materials.
3. Manipulate the dental materials commonly used in the practice of dental hygiene.

MAJOR COURSE REQUIREMENTS

This course has been divided into seven units and they are:
A. Introduction to Dental Materials and Preventive Materials
B. Characteristics of Materials and Abrasion and Polishing
C. Impression Materials and dental plaster and stone
D. Polymers for Prosthetics
E. Intermediate Materials and Cements, also Provisional Restoratives
F. Direct Esthetic Anterior Restoratives and Direct Posterior Restoratives
G. Materials for Inlays, onlays, crowns, and bridges; Materials for Cast Restorations, Metal Alloys for Orthodontics, Prosthodontics, and Pediatric Dentistry, and Dental Implants.

Two days after each lecture, there will be a lab which the student will demonstrate the preparation, use, and storage of the dental materials presented in lecture.

LEARNING OUTCOMES

I. STUDENT LEARNING OUTCOMES
   (By Units)

A. Introduction to Dental Materials
   1. Discuss why dental hygienists need to know about dental materials.
   2. Describe the properties of an ideal dental material.
   3. Describe specific conditions within the oral cavity that limit the success and uses of dental materials.
   5. Describe characteristics of each class of dental materials.
   6. Discuss the programs existing to ensure safety and quality control in the manufacturing of dental materials and devices.

Laboratory Objectives

7. Demonstrate use of eye-wash station.
8. Demonstrate safe workplace procedures.
9. Identify first aid kit location.
10. Utilize personal protective equipment as required by OSHA guidelines.

B. Preventive Dental Materials and Abrasives
1. Compare and contrast preventive materials.
2. Describe the composition and uses of resin-based pit and fissure sealants.
3. Discuss the causes of failure and clinical success rates for pit and fissure sealants.
4. Describe the composition of fluoride gels and varnishes.
5. Describe the general composition of glass ionomers used as preventive materials.
6. Compare the clinical results for filled or unfilled resin and glass ionomer pit and fissure sealant.
7. Discuss the release of fluoride from glass ionomers and resin-based materials in terms of the quantity and rate of release.
8. Identify the composition and describe the physical characteristics of a mouth-protecting material.
9. Describe the procedures involved in the formation of a stock and a custom mouthguard and compare the benefits of each.
10. Compare and contrast the various abrasive agents used for polishing natural dentition and restorative materials.

Laboratory objectives
11. Place a pit and fissure sealant on a laboratory model, and to clinical competency on a classmate.
12. Choose the appropriate professional fluoride modality and give a fluoride treatment to a classmate following sealant placement.

C. Impressions, Study Models, and Acrylcs
1. List the characteristics of an ideal impression material.
2. Define relevant terms.
3. Compare and contrast elastomeric and inelastic materials, giving examples.
4. Compare the physical and chemical structure of plaster, stone, die stone, and gypsum and their strengths and setting expansion.
5. Describe the manufacturing process for gypsum products.
6. Explain the effects of water-to-powder ratio, additives, contaminants, temperature, and mixing on setting time of gypsum products.
7. Discuss the various polymers used in dentistry.
8. Describe the process of polymerization.
9. Discuss the different types of acrylics and their uses in dentistry.

Laboratory objectives
11. Pour a gypsum cast from an impression.
12. Take an alginate impression.
13. Trim a gypsum model. (SCANS 5B)
15. Fabricate a custom bleaching tray (SCANS 5A)
16. Take a rubber base or polyvinyl impression from a custom tray.
17. Repair and clean a denture.

D. Temporary Restorations and Cements, Direct Restorations, Suture Removal, Periodontal Dressings
1. Define relevant terms.
2. Identify the physical requirements for temporary restorative materials.
3. Compare the differences between bases and liners.
4. Discuss the different forms and applications of calcium hydroxide.
5. Compare and contrast glass ionomer and zinc phosphate cements and the indications for each.
6. Describe the uses for periodontal dressings.
7. List the indications for provisional restorations.
8. Describe the different types of suture materials.
9. Discuss the materials used for anterior restorations and advantages of each.
10. Discuss the types of amalgams and advantages of each.
11. Compare and contrast amalgams, posterior composites, and direct gold restorations, including placement techniques.

**Laboratory Objectives**

12. Demonstrate proper mixing and placement techniques for liners, bases, varnishes, and cements.
18. Mix and deliver sedative/palliative materials.
13. Prepare a temporary crown and seat on a laboratory model.
14. Place and remove a periodontal dressing on a lab partner.
15. Remove sutures placed on a laboratory model.
16. Mix amalgam and posterior composite materials and place in prepared tooth models.

**E. Cast Restorations, Specialty Materials, and Dental Implants**
1. Define relevant terms.
2. List the advantages and disadvantages for the various types of materials used for cast restorations and implants.
3. Compare the compositions, properties, and uses of various materials used in cast restorations and dental implants.
4. Identify the major components in porcelain.
5. Identify the major components in casting materials including waxes, and investment materials. Discuss the casting process and the rationale behind each step.
6. Discuss the different types of dental implants and indications for each.
7. Identify the composition and properties of a dental implant.
8. Identify the factors affecting the success of dental implant therapy.

**Laboratory Objectives:**

9. Observe a casting procedure.
10. Make a temporary crown

**F. Student Learning Objectives for Critical Thinking**
1. The student will demonstrate the ability to identify the essential question, issue, and/or problem.
2. The student will demonstrate the ability to gather data relevant to the essential question, issue, and/or problem.
3. The student will demonstrate the ability to interpret appropriate data effectively.
4. The student will demonstrate the ability to recognize and evaluate assumptions, major alternative points of view and related theories, principles, and ideas relevant to the question, issue, and/or problem.
5. The student will demonstrate the ability to develop informed conclusions/solutions.
6. The student will demonstrate the ability to articulate implications and consequences that emerge from the conclusions/solutions.
7. The student will demonstrate the ability to communicate any or all parts of the above process in written or oral form.

**MAJOR COURSE LECTURE, TOPICS**
**DESCRIPTION/REQUIRED/RECOMMENDED READINGS/ELECTRONIC**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic/Lecture/Event</th>
<th>Required/Recommended Readings/Electronic Resources to View</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>May 12</td>
<td>LECTURE- Dental Materials Intro and Preventive Materials, LAB- Dental Sealants</td>
</tr>
<tr>
<td>2</td>
<td>May 19</td>
<td>LECTURE- Characteristics of Materials and Abrasion and Polishing Dental Materials, LAB- Dental Sealants</td>
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<tr>
<td>3</td>
<td>May 26</td>
<td>LECTURE- HOLIDAY, LAB- Clinical Impressions</td>
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<tr>
<td>4</td>
<td>June 2</td>
<td>TEST 1- on chapter 1, 2, 3, &amp; 14, LECTURE- Impression Materials and dental plaster and stone, LAB- Clinical Impressions and Models</td>
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<tr>
<td>5</td>
<td>June 9</td>
<td>LECTURE- Polymers for Prosthetics, LAB- Clinical Impressions and Models</td>
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<tr>
<td>6</td>
<td>June 16</td>
<td>TEST 2- on chapter 8, 9, &amp; 12, LECTURE- Intermediate Materials and Cements, also Provisional Restoratives, LAB- Cements, Custom Trays and Mouthguards</td>
</tr>
<tr>
<td>7</td>
<td>June 23</td>
<td>LECTURE- Direct Esthetic Anterior Restoratives, LAB-, Rubber dams, Perio dressing, &amp; suture</td>
</tr>
<tr>
<td>8</td>
<td>June 30</td>
<td>LECTURE- Direct Posterior Restoratives, LAB- mixing of amalgam, composites, bleaching, &amp; rubber base impression</td>
</tr>
<tr>
<td>9</td>
<td>July 7</td>
<td>TEST 3- on chapter 4, 5, 6, &amp; 10, LECTURE- Materials for Inlays, onlays, crowns, and bridges; Materials for Cast Restorations, LAB- Temporary crowns</td>
</tr>
<tr>
<td>10</td>
<td>July 14</td>
<td>LECTURE- Metal Alloys for Orthodontics, Prostodontics, and Pediatric Dentistry, and Dental Implants, LAB- Casting Demonstration, denture repair/cleaning.</td>
</tr>
<tr>
<td>11</td>
<td>July 21</td>
<td>LECTURE- TEST 4- on chapter 7, 11, 13, &amp; 15, TERM PAPER DUE- CRITICAL THINKING PROJECT Amalgam vs Composite, LAB- CLEANUP AND CATCHUP</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>COMPREHENSIVE FINAL</td>
</tr>
</tbody>
</table>
RESOURCES TO VIEW:

<table>
<thead>
<tr>
<th>Competency Number</th>
<th>Competency Statement</th>
<th>Instructional/Evaluation Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>5B</td>
<td>Applies technology to task</td>
<td>Study Model Competency</td>
</tr>
<tr>
<td>5A</td>
<td>Selects technology</td>
<td>Term paper</td>
</tr>
</tbody>
</table>

INSTRUCTOR: Dr. Bob Bennett      OFFICE: U 195

OFFICE HOURS: Mondays and Fridays 1:00 pm-2:00 pm
OFFICE TEL: 364-4690

COURSE MEETING TIMES: Mondays, 2:00-4:25 p.m. U127

INSTRUCTOR EMAIL ADDRESS: bob.bennett@harlingen.tstc.edu

REQUIRED TEXT AND MATERIALS:
Students will be required to wear scrubs to lab, and lab jacket when appropriate. Also required are safety glasses, pencils, paper, 2” notebook, and scantron sheets

NOTE: Any changes to this syllabus will be provided in writing to the student and updated on all posted locations (HB 2504, course Moodle sites, building offices, etc.).

GRADING CRITERIA

4 tests @ 15% each 60% of final grade
Term paper: Amalgam vs Composite 5% of final grade
(Critical thinking project)
Final examination 15% of final grade
Lab practicals and worksheets 20% of final grade

All grades are based on a perfect grade of 100
4 tests - each worth 15% for 60% of the grade
Final exam is worth 15% of the grade
If absent from a test- the make-up will automatically have 5 points deducted from the score. The second time a make-up test is required, 10 points will be deducted, and so on. Makeups must be within 1 week. NO EXCEPTIONS. BOTH LECTURE AND LABORATORY PORTIONS MUST BE PASSED WITH A 78% TO SUCCESSFULLY COMPLETE THIS COURSE.
All laboratory activities must be completed to successfully pass this course.
Cheating: any evidence of cheating or using the work of another as one’s own will result in immediate dismissal from the class session, and from the program if verified.
In accordance with the TSTC Student Handbook, participation and punctuality are expected. Learning activities in the course are designed to enhance the understanding of concepts. Each student is expected to prepare in advance for each session and to participate in an appropriate manner. It is the student’s responsibility to monitor their progress and to withdraw from the course if failing. Midterm advising will give the student feedback as to their progress. Total professionalism is expected at all times, and disruptive behavior is cause for dismissal from the session.

ACCOMMODATION STATEMENT: If you have a documented disability which will make it difficult for you to carry out classwork as outlined and/or if you need special accommodations due to a disability, please contact (956) 364-4520 or visit the Support Services Office in the Auxiliary Services Building as soon as possible to make appropriate arrangements.

CLASS POLICIES:
Copyright Statement
The materials used in the course [textbooks, handouts, media files (podcast, MP3, Videos, RSS (Feeds), and all instructional resources on the colleges Learning Management System (Moodle)] are intended for use only by students registered and enrolled in this course and are only to be used for instructional use, activities associated with, and for the duration of the course. All materials generated for this course, which includes but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and any additional materials.

These materials may not be retained in another medium or disseminated further. They are provided in compliance with the provisions of the Teach Act. These materials may not be reproduced, displayed, modified or distributed without the express prior written permission of the copyright holder or TSTC. For further information contact your instructor.
Communicating with your instructor (MyMail E-mail System)

All official college E-mail to students is sent through MyMail, the official student e-mail system at TSTC Harlingen. When communicating with instructors and/or employees of the college, you are required to use your TSTC MyMail student e-mail address. If you choose to forward your e-mail to another account, please be advised that you must respond from the MyMail account.

TSTC Harlingen faculty, staff, and students are asked to report all threats, perceived or real, immediately to College Police located in the Auxiliary Building. If the threat is imminent, the College Police emergency phone line at 364-4234 or 9-911 should be called. College Police will then coordinate the proper response in accordance with State and federal laws and TSTC System/College rules and regulations.

It is the responsibility of the STUDENT, not the instructor, to arrange for make-up work. You must make arrangements to make up your work on the first day of your return to class. The make-up work must be completed as soon as possible.

THREATS
TSTC Harlingen faculty, staff, and students are asked to report all threats, perceived or real, immediately to College Police located in the Auxiliary Building. If the threat is imminent, the College Police emergency phone line at 364-4234 or 9-911 should be called. College Police will then coordinate the proper response in accordance with State and federal laws and TSTC System/College rules and regulations.

Using Social Media in Classroom
The use of media and communications devices such as cell phone (Using cellphone voice recorder, webcam), laptop, laptop webcam, PDAs, during class/lab is expressively up to the discretion of your instructor. The recording of a class, lecture, taking images of the classroom, members of the class, and any activities within the classroom environment is not authorized without express permission from your instructor. At no time will any recordings that have been NOT approved be given to another party, or uploaded to a third party website. Recordings within a classroom and labs are regarded as property of the college. Any unauthorized recordings violates copyright issues explained previously in the syllabus.
NAME ______________________________________

### Critical Thinking Rubric for Research Paper

<table>
<thead>
<tr>
<th>Specific Outcomes</th>
<th>Proficient Critical Thinking</th>
<th>Emerging Critical Thinking</th>
<th>Beginning Critical Thinking</th>
<th>No Evidence of Critical Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student will demonstrate the ability to identify the essential question.</td>
<td>• Identifies with clarity the purpose for comparing amalgam and composites; improves knowledge about amalgam and composites with clarity and accuracy.</td>
<td>• Identifies with the purpose of asking the question about amalgam and composites; may lack clarity.</td>
<td>• Identifies an inaccurate purpose for asking the question about amalgam and composites.</td>
<td>• Fails to consider the purpose for asking the question about amalgam and composites.</td>
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<tr>
<td></td>
<td>• Improves knowledge about amalgam and composites.</td>
<td>• Improves knowledge about amalgam and composites; may lack clarity and accuracy.</td>
<td>• Makes little attempt to improve knowledge about amalgam and composites.</td>
<td>• Fails to provide any information to improve knowledge about amalgams and composites.</td>
</tr>
<tr>
<td>2. The student will demonstrate the ability to gather data relevant to the essential question.</td>
<td>• Demonstrates strong evidence of searching for data relevant to the question.</td>
<td>• Demonstrates adequate skill in searching for data relevant to the question.</td>
<td>• Demonstrates minimal evidence of searching for data relevant to the question.</td>
<td>• Demonstrates no evidence of data relevant to the question.</td>
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<tr>
<td></td>
<td>• Clearly and precisely integrates data gathered.</td>
<td>• Integrates data gathered, but expression may lack clarity and precision.</td>
<td>• Makes little attempt at integration of data gathered.</td>
<td>• Fails to integrate any of the data gathered.</td>
</tr>
<tr>
<td>3. The student will demonstrate the ability to effectively interpret data.</td>
<td>• Clearly and accurately expresses interpretations of data.</td>
<td>• Accurately expresses reasonable interpretation of the data, but the expression may be unclear.</td>
<td>• Expresses invalid interpretation of the data.</td>
<td>• Merely repeats the data; offers no interpretation.</td>
</tr>
<tr>
<td>4. The student will demonstrate the ability to evaluate the data.</td>
<td>• Clearly Demonstrates The ability to evaluate the data.</td>
<td>• Demonstrated the ability of evaluating the data, but lacked some information.</td>
<td>• Insufficiently demonstrated the ability to evaluate the data.</td>
<td>• Fails to demonstrate the ability to evaluate the data.</td>
</tr>
<tr>
<td>5. The student will demonstrate the ability to correctly develop a dental hygiene diagnosis from assessment.</td>
<td>• Develops reasonable and well thought-out conclusions.</td>
<td>• Develops a reasonable conclusion.</td>
<td>• Inaccurate conclusion.</td>
<td>• Fails to develop a conclusion.</td>
</tr>
<tr>
<td></td>
<td>• Uses a broad range of assessment to justify the conclusions.</td>
<td>• Uses relevant criteria to justify the conclusion.</td>
<td>• Misidentifies conclusion.</td>
<td>• Fails to justify any conclusion.</td>
</tr>
<tr>
<td>Level 1</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Level 4</td>
<td></td>
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<tr>
<td>Demonstrates strong command of the components of language, i.e., vocabulary, grammar, and mechanics; errors are minimal.</td>
<td>Demonstrates good command of the components of language, i.e., vocabulary, grammar, and mechanics; errors are not distracting or frequent.</td>
<td>Demonstrates some command of the components of language, i.e., vocabulary, grammar, and mechanics; errors are frequent and may distract from meaning.</td>
<td>Demonstrates poor command of the components of language, i.e., vocabulary, grammar, and mechanics; errors are so frequent that they distract from meaning.</td>
<td></td>
</tr>
<tr>
<td>Clearly and precisely explains key concepts and ideas used.</td>
<td>Explains key concepts and ideas used, but explanation may lack clarity or precision.</td>
<td>Explains few key concepts and ideas.</td>
<td>Fails to explain key concepts and ideas.</td>
<td></td>
</tr>
<tr>
<td>Organization is clear.</td>
<td>Basic organization is apparent.</td>
<td>Poorly organized and may be unfocused.</td>
<td>No evidence of organization.</td>
<td></td>
</tr>
<tr>
<td>Uses transitions to connect ideas to enhance communication.</td>
<td>Format is appropriate although at times inconsistent.</td>
<td>Uses inappropriate transitions to connect ideas.</td>
<td>Fails to use transition to connect ideas.</td>
<td></td>
</tr>
<tr>
<td>Consistent use of appropriate format.</td>
<td></td>
<td></td>
<td>Format is distracting.</td>
<td></td>
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</table>