DAKOTA COLLEGE AT BOTTINEAU

COURSE SYLLABUS

Course Prefix/Number/Title: DENT 118 Biomaterials

Number of Credits: 3 credits

Course Description:
This course will provide the dental hygiene or dental assisting student sound knowledge base in the science of dental materials. Emphasis will be placed on the properties, handling and manipulation of commonly used dental materials. The student will demonstrate knowledge of the properties and competence in the uses and manipulation of dental materials to include: gypsum, restorative materials, dental cements, impression materials, acrylics and thermoplastics, waxes, abrasive agents and study casts/occlusal registrations. Laboratory safety and infection control measures will be utilized.

Pre-requisites: The student must be accepted into the Dental Assisting or Dental Hygiene program.

- DENT 116 Dental Anatomy

Co-requisite:

- DENT 117 Introduction to Infection Control, immunology, and Medical emergencies in the Dental Practice

Course Objectives:

1. Understand the physical, chemical and biologic properties of the specific dental materials addressed by this course.
2. Relate the physical, chemical, and biologic properties to the selection, handling, and care of dental materials used within the scope of dental assisting/hygiene practice.
3. Recognize, select, and apply dental materials used in preventive and therapeutic dental procedures to provide quality patient care that is within the dental assistants'/hygienists' scope of practice.
4. Demonstrate current infection control and safety procedures according to the CDC for Dental Healthcare Settings, in the laboratory and clinical settings, when using a given dental material or providing dental assisting services.

Dental Assisting Student Learning Outcomes addressed in this course

1. **Competently execute dental assisting skills**: Utilize current guidelines for infection control, occupational safety, and perform four-handed chairside dental assisting duties and advanced functions as permitted by the North Dakota Board of Dentistry.

2. **Maintain dental and business office records**: Ensure compliance with HIPAA regulations while managing dental office records effectively.
3. **Apply legal and ethical standards**: Adhere to the North Dakota Dental Practice Act and exhibit professionalism in all interactions with patients, coworkers, and other healthcare professionals.

4. **Provide compassionate and culturally aware care**: Deliver dental assisting services with respect and sensitivity to cultural diversity.

Dental Assisting Program Goals:

1. Earn and maintain full accreditation status according to the Commission on Dental Accreditation (CODA).
2. Admit 100% (12/12) qualified dental assisting students annually according to Dakota College Bottineau's dental assisting program acceptance criteria.
3. Maintain an annual program completion rate of 92% (11/12).
4. Maintain an annual job placement rate of 92% (11/12).
5. Maintain employer satisfaction rate of 90% with readiness skills and content preparation of graduates.

Dental Hygiene Student Learning Outcomes addressed in this course

1. Provide patient centered, comprehensive, evidence-based dental hygiene care to a diverse socioeconomic, educational, and cultural patient population.
2. Apply the principles of professional and ethical standards in providing dental hygiene care to individuals of all populations.
3. Provide students with opportunities for interprofessioinal community health promotion.
4. Exhibit professionalism and communicate effectively with patients, coworkers, and other healthcare professionals.
5. Engage in professional activities and lifelong learning.

Dental Hygiene Program Outcomes

1. Prepare highly qualified dental hygiene professionals by providing up-to-date, high quality academic and clinical dental hygiene education.
2. Provide a competency-based education.
3. Provide students with opportunities for interprofessional community health promotion.
4. Earn and maintain full accreditation status according to the Commission on Dental Accreditation.
5. Incorporate emerging technologies to enhance quality dental hygiene care.
6. Prepare students to engage in professional activities and lifelong learning.

Instructor: Dr. Mark Hildahl DDS

Office: N/A

Office Hours: Available upon request

Phone: N/A

Email: mark.hildahl@dakotacollege.edu

Lab Instructor: Ms. Ricki Hill CDA, RDA, RF

Office: 2nd Floor Faculty

Office Hours: Tuesdays 8am-12pm or upon appointment

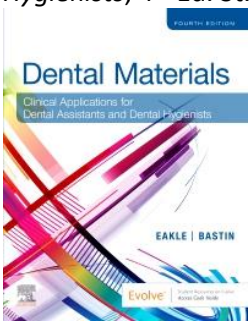
Phone: 701-858-3183

Email: ricki.hoffman@dakotacollege.edu

Lecture/Lab Schedule: This course meets for two hours lecture and 2 hours lab per week for one semester for 64 contact hours. The lecture will be online, the lab face-to-face.

Textbook Required:

Eakle, W.S., Bastin, K.G. (2021). *Dental Materials: Clinical Applications for Dental Assistants and Dental Hygienists*, 4th Ed. St. Louis, MO. Elsevier. ISBN: 978-0-323-59658-9.



Required Materials: PPE

Course Requirements:
Attendance is mandatory in all lectures, and labs sessions.
The student must complete all tests, assignments and lab competencies.

Tentative Course Outline:

Week	Topic
Week 1	Ch. 1 Introduction to Dental Materials
Week 2	Ch. 2 Oral Environment and Patient Considerations
Week 3	Ch. 3 Physical and Mechanical Properties of Dental Materials

Week 4	Ch. 15 Impression Materials
Week 5	Ch. 15 Impression Materials (Continued)
Week 6	Ch. 16 Gypsum and Wax Products
Week 7	Ch. 5 Principles of Bonding
Week 8	Ch. 6 Composite, Glass Ionomers and Compomers
Week 9	Ch. 9 Dental Ceramics
Week 10	Ch. 10 Dental Amalgam
Week 11	Ch. 11 Metals and Alloys
Week 12	Ch. 13 Abrasion, Finishing, Polishing and Cleaning
Week 13	Ch. 14 Dental Cements
Week 14	Ch. 17 Polymers for Prosthetic Dentistry
Week 15	Ch. 19 Preventive & Corrective Oral Appliances
Week 16	Review for final exam
Final exam week	Final Exam

General Education Competency/Learning Outcome(s) OR CTE Competency/Department Learning Outcome(s):
Employs industry-specific skills for workplace readiness.

Relationship to Campus Focus: Nature, Technology and Beyond
Dakota College Bottineau dental programs are designed to prepare students to meet the needs of communities by applying evidence-based decision making, using cutting-edge technology, and integrating quality and safety competencies into their dental programs. Each course within the program serves as a foundation for clinical practice in the dental assisting and dental hygiene professions. To meet the demands of the ever-changing field of dentistry, students are taught to value life-long learning.

Grading
Course and lab/clinic grades are based on a variety of activities and assignments designated by the faculty. The criteria by which grades for each lecture and clinical course are included in the course syllabus distributed to students. Students have access to and should review the learning management system grading calculation method.

Students are responsible to know what their grades are during the course. Please review the gradebook frequently. If an assignment or exam in the student's gradebook says the assignment or exam has not

been submitted or has not been entered, it is then treated as a fact the student didn't do the assignment or exam as outlined in the directions. Make sure your assignments are submitted before the due date to assure timely submission. Please see your Dakota Dental Program handbook for grading policies, in addition to the policies listed below.

Grades
Students must earn a minimum grade of "C" with a maintained 2.0 GPA or better in all required dental program courses. Students who fail a theory or lab/clinical course will be dismissed from the dental assisting program. A final grade of "D" or "F" is considered to be a failed grade. If a student has unsatisfactory grades, he/she should contact the instructor as soon as possible for a remediation plan.

Assignments/Tests/Labs/Clinics: All assignments must be completed and submitted on time in the manner specified by the faculty. Students may fail the course if all assignments are not completed.

Late /makeup work: Late work will not be accepted (student will receive a zero) unless previously arranged with the instructor or impacted by extenuating circumstances. Upon approval, if an assignment is turned in within one week of the due date, there will be a 5% deduction from the assignment grade. Extenuating circumstances will be evaluated by the faculty for the course.

Late tests: If the student fails to take a test on time, he/she will need to contact the instructor to arrange a time to take the exam. There will be a 10% deduction from the test grade, for tests taken late. If a test isn't taken within a week of the test date, you will receive a zero for that test. Extenuating circumstances will be evaluated by the faculty for the course.

Methods for Assessing Student Learning:

Professionalism	**Points Possible**
8 points per session (16 sessions total)	**128**

Graded Assignments	**Points Possible**
Intro to Biomaterials ADA Seal Assignment	8
Going Green in the Dental Practice Discussion	8
Physical and Mechanical Properties of Dental Materials Online discussion	4
Impression Materials scenario for online discussion	10
Gypsum Chart	25
Principles of Bonding Explain & Summarize	8
Composite, Glass Ionomers & Compomers Advantages and Disadvantages	10
Dental Ceramics Questions	14
Amalgam Scenario	10

Metals and Alloys Definitions and abrasives for polishing	10
Dental Cements Chart with information on each cement	15
Polymers Scenario	6
Preventive and Corrective Oral Appliances Critical Thinking Question	6
Total possible points for graded assignments	**134**

Exams	**Points Possible**
Introduction to Dental Materials	15
Oral Environment and Patient Considerations & 4 General Handling and Safety of Dental Materials	55
Physical and Mechanical Properties of Dental Materials	25
Impression Materials	20
Gypsum and Wax Products	28
Principles of Bonding	24
Composites, Glass Ionomers, and Compomers	33
Dental Amalgam	20
Metals and Alloys	24
Abrasion, Finishing, Polishing and Cleaning	20
Dental Cements	25
Polymers for Prosthetic Dentistry	25
Final Exam- Comprehensive	100
Total points possible	**414**

Skill Competencies	**Points Possible**
Safety Data Sheet	27
Mixing alginate impression material	30
Taking a maxillary and mandibular alginate impression	43
Taking a wax bite	36
Disinfect Impression or Bite Registration	24
Mixing dental plaster/gypsum	33
Pouring dental models using the inverted-pour method	87
Trimming and finishing dental models	66
Mixing Polysiloxane material for a bite registration	27
Preparing an automix final impression material	39
Mixing a two-paste final impression material	60
Mixing zinc oxide eugenol bite registration material	30

Creating a light-cured custom tray	51
Creating an acrylic resin custom tray	66
Glass Ionomer cement: premeasured capsule	27
Mixing composite resin for permanent cementation	27
Mixing zinc phosphate cement: primary consistency	24
Mixing polycarboxylate cement for permanent cementation	24
Mixing zinc oxide eugenol for temporary cementation	24
Constructing a vacuum-formed custom tray	45
Total points possible	**790**

This course grade will be calculated by the percentages in the chart below:

Final course grade calculation	**Percentage of final grade**	**Points possible**	**Percentage calculated**
Professionalism	5%	128	6
Graded Assignments	20%	134	27
Exams including final exam	25%	414	104
Lab skill competencies	50%	790	395
Total points for the course	**100%**		**532**

The following grade scale will be used:

A	92 - 100	489 and above
B	84 – 91	447 - 488
C	75 – 83	399 - 446
D	67 – 74	356 - 398
F	Below 67	355 and below

Classroom Policies

Classroom Etiquette*:*

- Be punctual to lectures, labs and clinics
- Avoid any activity that may cause distraction during class.
- Incivility will not be tolerated
- Use of mobile devices and related applications and cameras are not allowed to be used, unless it is for a class activity.
- Children are not allowed in the classroom.

Active Learning*:*

In addition to educational strategies such as reading, listening and reflecting, when appropriate this class makes use of learning techniques commonly known as active learning. Students should expect to participate in active learning techniques such as discussions and presentations, small group activities, writing, problem-solving, case studies, role-playing, etc. These activities promote analysis, synthesis, and evaluation of class content in order to improve student learning outcomes.

Course Study Expectations*:*
Commitment to learning is important to success. For every semester credit you are taking in a class, (e.g., 3 credit course = 9 hours per week) the student should schedule three hours to read, study, and devote to your course, outside of class.

Attendance Policy*:*
The Dakota College Dental Programs support the college policy on attendance as stated in your college catalog. The dental programs implement strict attendance policies for classroom, lab and clinical experience. Students are expected to attend all lecture, lab and clinical hours. (See the Attendance Policy in the Dental Program Handbook)

Regular, punctual attendance demonstrates professional behavior and responsibility. Absences may make it impossible for a student to meet course objectives and may result in failure of the course. A student may be excused from class, lab or clinic with the approval of the instructor. It is the student's responsibility to make arrangements to fulfill missed assignments with the appropriate faculty member. All makeup work may have a deduction in lecture, lab or clinic. All missed hours in lab or clinic must be made up with one hour for each hour missed. If a student has more than 25% absence in any classroom, lab or clinic session, it may result in course failure. **If you must be absent, (e.g., illness) please inform the instructor as soon as possible.** The instructor's contact information is on the first page of this syllabus.

Questions:
If you have questions or need clarification on anything to do with this course, please reach out to the instructor. The instructor can be reached by the contact information on the syllabus.

Student Email Policy:
Dakota College at Bottineau is increasingly dependent upon email as an official form of communication. A student's campus-assigned email address will be the only one recognized by the Campus for official mailings. The liability for missing or not acting upon important information conveyed via campus email rests with the student.

Academic Integrity:
According to the DCB Student Handbook, students are responsible for submitting their own work. Students who cooperate on oral or written examinations or work without authorization share the responsibility for violation of academic principles, and the students are subject to disciplinary action even when one of the students is not enrolled in the course where the violation occurred. The Code detailed in the Academic Honesty/Dishonesty section of the Student Handbook will serve as the guideline for cases where cheating, plagiarism or other academic improprieties have occurred.

Disabilities or Special Needs:
Students with disabilities or special needs (academic or otherwise) are encouraged to contact the instructor and Disability Support Services.

DCB Syllabus edited by dental faculty June 2024

Title IX:
Dakota College at Bottineau (DCB) faculty are committed to helping create a safe learning environment for all students and for the College as a whole. Please be aware that all DCB employees (other than those designated as confidential resources such as advocates, counselors, clergy and healthcare providers) are required to report information about such discrimination and harassment to the College Title IX Coordinator. This means that if a student tells a faculty member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty member must share that information with the College's Title IX Coordinator. Students wishing to speak to a confidential employee who does not have this reporting responsibility can find a list of resources on the DCB Title IX webpage.

Fall semester

Week and Course Objectives (Listed above)	**Lecture Topics & Specific Instructional Objective:** At the end of each unit, the student will be able to:	**Student Preparation, Learning Experiences and Evaluation Methods**
Week 1 Course Objectives: 1, 2	**Course Overview for Lecture and Lab components** **Ch. 1 Introduction to Dental Materials** **1.** Discuss the importance of the study of dental materials for the allied oral health practitioner. **2.** Discuss why it is necessary that the allied oral health practitioner have an understanding of dental materials in the delivery of dental care. **3.** Discuss evidence-based decision-making (EBDM) as it relates to dental materials; what questions might you ask yourself or your practice to ensure you are increasing the potential for successful patient care outcomes? **4.** Review the historical development of dental materials. **5.** List and compare the agencies responsible for setting standards and specifications of dental materials. **6.** Discuss the requirements necessary for a consumer product to qualify for the ADA Seal of Acceptance.	**Online Activities for Ch. 1** 1. Listen to PPT Ch. 1 lecture and follow along with the chapter in the textbook. Take notes on the handout provided. Jot down unfamiliar terms or material that needs clarification. We will discuss and clarify these questions in our lab sessions. 2. Answer the Review Questions in the text. 3. List the criteria necessary for a consumer product to qualify for the ADA Seal of Acceptance. 4. **Complete Graded Assignment for Week 1:** Compile a list of 5 dental products that display the ADA Seal of Acceptance and are found in your local Target, Walmart or drug store. 1. How is the seal displayed on these items? 2. Ask at least 3 family or friends if this seal is important to them?

		3. How does the presence of the seal affect you recommendation of a particular product? Why? Post to BB LMs. 5. Study for online test. **Lab:** Class activities • Class tour of biomaterials lab • Address any questions from didactic material. • ADA seal of Acceptance activities • Case based discussion question group discussion
Online Test on Ch. 1	15 points	
Week 2 Course Objectives: 1, 2	**Ch. 2 Oral Environment and Patient Considerations** 1. Discuss the qualities of the oral environment that make it challenging for long-term clinical performance of dental materials. 2. Describe the long-term clinical requirements of therapeutic and restorative materials. 3. List and give examples of the four types of biting forces and the tooth structures most ideally suited to them. 4. Define stress, strain, and ultimate strength and compare the ultimate strength of restorative materials during each type of stress to tooth structures. 5. Explain how moisture and acidity in the mouth can affect dental materials. 6. Explain how galvanism can occur in the mouth and how it can be prevented. 7. Discuss thermal conductivity and thermal expansion and contraction,	**Lecture:** Online activities Read/Listen to PPTS. Take notes of important concepts or questions you have using the handout provided. Using Evolve Student Resources: Watch Video 2.1 Basic Dental Terminology Watch Video 4.3 OSHA Training Pertaining to SDS Sheet Take practice Quiz **Lab:** Class activities • Using photos provided, students will identify a property that the dental material should possess in order to be applied in each situation, e.g., mouth with numerous restorations vs. a mouth with no

	and compare the values of thermal expansion and conductivity of restorative materials with those of tooth structures. 8. Explain how mechanical and chemical adhesion, or bonding, work to retain restorations. 9. Describe the factors that determine successful adhesion, including wettability, viscosity, film thickness, and surface characteristics. 10. Describe microleakage and how it can lead to recurrent decay and postoperative sensitivity. 11. Define biocompatibility and discuss why requirements for biocompatibility may fluctuate. 12. Describe tooth color in terms of hue, value, and chroma. 13. Discuss the characteristics of oral biofilm and its role in the etiology of dental caries and periodontal disease. 14. Explain the importance of detection of restorations and methods for detection. **Ch. 4 General Handling and Safety of Dental Materials in the Dental Office** 1. Identify five job-related health and safety hazards for employees in dental offices, and explain the methods of prevention for each one. 2. Explain the components of the Occupational Safety and Health Administration Hazard Communication Standard. 3. Describe the ways that chemicals can enter the body. 4. Describe the employee and employer responsibility for safety training. 5. Describe the basic infection control methods for the handling of dental materials in the treatment area.	restorations, small cavities vs. large cavities, etc. • Safety Data Sheet and label exercise • Student presentations on diagnostic techniques **Graded Assignment Ch. 4 General Handling of Dental Materials Online Discussion** Using BB LMS Discussion Board, discuss at least two ideas of how the American Dental Association (ADA) Top Ten Initiatives of sustainability can be incorporated into a general dental practice and why that will help the environment. After your post, respond to two classmates' posts.

	6. Identify the concepts and benefits of *going green* in the dental practice. 7. Discuss how the ADA Top Ten Initiatives of sustainability can be incorporated into a general dental practice.	
Online Test on Ch. 2 & 4	**55 points**	
Week 3 Course Objectives: 1,2	**Ch. 3 Physical and Mechanical Properties of Dental Materials** 1. Define primary and secondary bonds and give an example of how each determines the properties of the material. 2. Describe the three forms of matter and give a defining characteristic of each. 3. Define density and explain the relationship of density, volume, and crystalline structure. 4. Define hardness and describe how hardness contributes to abrasion resistance. 5. Define elasticity and give an example of when elasticity is desirable in dental procedures. 6. Relate stiffness and proportional limit, and describe how these properties apply to restorative dental materials. 7. Define ductility and malleability and explain how these characteristics contribute to the edge strength of a gold crown. 8. Explain the difference between toughness and resilience. 9. Define brittleness and discuss how this property applies to restorative dental materials. 10. Define viscosity and thixotropy and describe the clinical significance of each. 11. Differentiate between therapeutic, preventive, and restorative materials.	**Lecture: online activities** 1. Read/Listen to PPT. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources: o View Video 3.1 Common Dental Procedures 3. Answer Review Questions in text for Ch. 3 4. **Complete Graded Discussion Assignment for** Ch. 3: 4 points A dentist must have a thorough understanding of the physical structure of materials. Why is it also important for the dental auxiliary to have a working knowledge of the physical structure of materials? Students should post answers and conduct an online discussion in comments. Each student should offer critical feedback to at least two other students. 5. Using Evolve Student Resources Do the Practice Quiz for Ch. 3 6. Study for online test.

	12. List and describe the three main types of restorative dental materials. 13. Describe the reaction stages a material undergoes to acquire its final state. 14. Describe the variables in the manipulation of a material.	**Lab:** • Have students work in small groups to compare and contrast the properties of the three states of matter. Then have groups share their answers. • Assign the students key words. Divide them up evenly between the students. The student must find define the word and write down an explanation as to how it pertains to biomaterials.Then have each student explain their key words to the class.
Online Test on Ch. 3	**25 points**	
Weeks 4 Course Objectives: 1,2,3,4	**Ch. 15 Impression Materials** 1. Describe the purpose of an impression. 2. Describe the three basic types of impressions. 3. Explain the importance of the key properties of impression materials. 4. Explain why alginate is an irreversible hydrocolloid. 5. List the supplies needed to make an alginate impression and explain how they are used. 6. Select trays for alginate impressions for a patient. 7. Mix alginate, load and seat the tray, and remove the set impression. 8. Evaluate upper and lower alginate impressions, in accordance with the criteria for acceptability. 9. Disinfect alginate impressions and prepare them for transport to the office laboratory. 10. Troubleshoot problems experienced with alginate impressions.	**Lecture:** online activities You will be working on these activities for Weeks 4 & 5. 1. Read/Listen to PPTS. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources watch ○ Video 15.2 Mixing Alginate and Loading Trays ○ Video 15.3 Alginate Impressions ○ Video 15.5 Wax Bite Registration 3. Answer Review Questions in text for Ch. 15 **4. Complete Discussion Graded Assignment for Ch.15.** Sara is preparing to take alginate impressions on a patient to fabricate whitening trays. When

		she mixes the water and alginate powder together and loads the impression tray with the alginate, the alginate is less viscous (thick) than she hoped and it is running out of the back of the tray. -What is causing the alginate material to be thin and runny? -How would Sara correct this problem? -What should Sara do right after she has removed the impression and inspected it? -How should Sara store the alginate impression if she cannot pour up the impression immediately? Write your reply. Then respond to two classmates' posts on BB LMs. 5. Using Student Evolve Resources do the Practice Quiz for Ch. 15 6. Study and take online test. **Lab:** 1. Gather Armamentarium 2. Prepare tray and material 3. Mixing Alginate and Loading Trays 4. Placement and Removal of tray 5. Storage 6. Procedure 15.2: Making an Alginate Impression 7. Procedure 15.5 Wax Bite Registration 8. Procedure 15.6 Disinfection of Impression Material and Bite Registration
Week 5 Course Objectives: 1,2,3,4	**Ch. 15 Impression Materials** (Continued)	Watch Evolve Student Resources: Video 15.1: Custom Tray Fabrication (with Triad TruTray)

	11. Compare similarities and differences among the physical and mechanical properties of polyvinyl siloxane (PVS) and polyether impression materials. 12. Discuss the advantages and disadvantages of using polyether impression material for a crown impression. 13. Explain the difference between a hydrophobic and a hydrophilic impression material. 14. Make a registration of a patient's bite in centric occlusion. 15. Assemble the cartridge of impression material with mixing tip and load into the dispenser. 16. Explain what a digital impression is and how it is used. 17. Describe the advantages and disadvantages of digital impressions. 18. Disinfect PVS and polyether impressions and prepare them for transport to the dental laboratory.	Video 15.8: The Triple Tray Impression Technique: A Clinical Guide **Lab:** Procedure 15.2: Making an Alginate Impression Procedure 15.5 Wax Bite Registration Procedure 15.6 Disinfection of Impression Material and Bite Registration Procedure 15.1 Custom Tray Fabrication Procedure 15.8: The Triple Tray Impression Technique
Online Test Ch. 15	**20 points**	
Week 6 Course Objectives: 1,2,3,4	**Ch. 16 Gypsum and Wax Products** 1. Differentiate between negative and positive reproduction. 2. Differentiate among diagnostic cast, working cast, and dies. 3. Describe the chemical and physical nature of gypsum products. 4. Explain the manufacturing process for gypsum products and how this affects their physical characteristics. 5. Compare the following properties and behaviors of gypsum products: strength, dimensional accuracy, solubility, and reproduction of detail. 6. List the American Dental Association–recognized gypsum products and their most appropriate uses.	**Lecture:** Online activities 1. Read/Listen to PPT Ch. 16. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources: o Video 16.1: Mixing Gypsum Products, Pouring Diagnostic Cast and Removal of Cast from impression o Video 16.2 Making a stone base 3. Answer Review Questions in text for Ch. 16

	7. Explain initial and final set of gypsum and the factors that affect the setting time, setting expansion, and strength. 8. Explain the procedure for mixing and handling gypsum products to create diagnostic casts. 9. Identify the common components of dental waxes. 10. Compare the properties of waxes. 11. Describe the clinical/laboratory significance of each of the properties of waxes. 12. Discuss the three classifications of waxes. 13. Differentiate between direct and indirect waxings and identify which property of dental waxes is most important in their difference. 14. Describe the usual color, form, and use of inlay, casting, baseplate, boxing, utility, and sticky waxes. 15. Prepare model plaster or stone for pouring. 16. Pour the anatomic and base portions of maxillary and mandibular diagnostic casts. 17. Trim maxillary and mandibular diagnostic casts. 18. Obtain a bite registration, using bite registration or utility wax.	**4. Complete Graded Assignment for Ch.16:** Create a chart comparing the following properties and behaviors of gypsum products: Main use, strength, dimensional accuracy, solubility, and reproduction of detail. ○ Type I: Impression plaster ○ Type II: Model plaster ○ Type III: Dental stone ○ Type IV: Die stone ○ Type V: High-strength, high-expansion dental stone Submit online to BB. 5. Using Student Evolve Resources do the Practice Quiz for Ch. 16 6. Study and take the online test for Ch. 16. **Lab:** Class activities • Make alginate impressions-maxillary and mandibular • Take a wax bite registration • Disinfect impressions and bite registrations • Mix gypsum material • Pour anatomic & base portions of casts
Online Test Ch. 16	**28 points**	
Week 7 Course Objectives: 1,2,3,4	**Ch. 5 Principles of Bonding** 1. Discuss the effects of acid etching on enamel and dentin. 2. Describe the basic steps of bonding. 3. Explain the differences between bonding to enamel and bonding to dentin.	**Lecture:** Online activities 1. Read/Listen to PPT Ch. 5. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources:

	4. Discuss the significance of the smear layer. 5. Describe “wet” dentin bonding. 6. Compare total-etch and self-etch bonding techniques. 7. Explain how the hybrid layer is formed and its importance in bonding to dentin. 8. Explain how universal adhesives differ from etch-and-rinse and self-etch adhesives. 9. Discuss the factors that interfere with good bonding. 10. Discuss the adverse effects of microleakage at restoration margins. 11. Describe how to bond ceramic veneers. 12. Describe the bonding of orthodontic brackets. 13. Explain the differences in bonding to enamel, dentin, metal, and ceramic. 14. List the factors that contribute to tooth sensitivity after bonding.	○ Video 5.1: The Structure of a Tooth - Enamel ○ Video 5.2: Guidelines for Adhesive Dentistry ○ Video 5.3: Application of Self-Etch Adhesive ○ Video 5.4: Self-etch vs Etch-and-rinse 3. Answer Review Questions in text for Ch. 5 **4. Complete Graded Assignment for Ch. 5:** Carrie, a new patient in your dental practice, needs some restorative treatment. She requested the fillings she needs be done in tooth-colored material rather than silver. Dr. Craig has already treatment planned composite restorations due to the location in the mouth and the size the fillings will be. While reviewing the informed consent, Carrie wants to know how the filling material sticks to the tooth. How would you respond? Write out your answer using information from your textbook. Submit to BB LMS. 5. Using Student Evolve Resources do the Practice Quiz for Ch. 5 6. Study and take online Test Ch. 5 **Lab:** Class activities • Trim maxillary and mandibular casts from last week • Take maxillary and mandibular alginate impressions and wax bite, disinfect

		• Pour up using gypsum
Test Ch. 5	**24 points**	
Week 8 Course Objectives: 1,2,3,4	**Ch. 6 Composite, Glass Ionomers and Compomers** 1. Describe the various types of composite resin restorative materials. 2. Discuss the advantages and disadvantages of each type of composite resin. 3. Discuss the similarities and differences among chemical-cured, light-cured, and dual-cured composite resins. 4. Describe how fillers affect the properties of composites. 5. Explain why incremental placement of composite resin is recommended. 6. Describe the factors that determine how long an increment of composite resin should be light-cured. 7. Discuss the procedural differences between direct and indirect composite restorations. 8. Describe the composition of glass ionomer restoratives and their uses, advantages, and disadvantages. 9. Explain the effects of fluoride-releasing, resin-modified glass ionomer restorations in the prevention of recurrent caries. 10. List the components of compomers. 11. Describe the uses of compomers. 12. Compare the clinical applications of composite resin restorative materials with glass ionomer cement restorative materials.	**Lecture:** Online activities 1. Read/Listen to PPT Ch. 6. Take notes of important concepts or questions you have using the handout provided. 2. Answer Review Questions in text for Ch. 6 **3. Complete Graded Assignment for Ch. 6:** 4. Using Student Evolve Resources do the Practice Quiz for Ch. 6 • Describe how the three different types of composite resins are cured • List the advantages and disadvantages of glass ionomer cements. Submit online to BB LMS. 5. Study and take online test. **Lab:** Class activities 6. Make alginate impressions-maxillary and mandibular 7. Take a wax bite registration 8. Disinfect impressions and bite registration 9. Mix gypsum material 10. Pour anatomic & base portions of casts 11. Trim models from last week
Online Test on Ch. 6	**33 points**	

Week 9 Course Objectives: 1,2,3,4	**Ch. 9 Dental Ceramics** Lesson 9.1: Dental Ceramics 1. Discuss the attributes and shortcomings of dental porcelains. 2. Compare the clinical applications of restorations made from porcelain with those made from lithium disilicate. 3. Explain why crowns made from zirconia can be used to restore molars. 4. Describe the methods used to process ceramic restorations. 5. Present a rationale for the selection of ceramic materials for restorations used in the anterior and posterior parts of the mouth. 6. Describe how porcelain bonds to metal for porcelain-fused-to-metal (PFM) crowns. 7. Select the appropriate cement for use with glass-based ceramic materials. 8. Describe common causes for failure of ceramic restorations. 9. Finish and polish ceramic restorations without generating too much heat or stress in the material. 10. Compare the relative strengths of feldspathic porcelain, lithium disilicate, and zirconium. 11. Explain how CAD/CAM technology is used to fabricate a ceramic crown. 12. List the clinical applications for all-ceramic restorations.	**Lecture:** Online activities 1. Read/Listen to PPT Ch. 9. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources: ○ Watch Video Video 9-4 Dental Shade Selection Using the Vita Classic Shade Guide ○ Watch Video 9-1 CAD/CAM Technology: From Preparation to Digital Impression to Milling of Restoration and Delivery 3. Answer Review Questions in text for Ch. 9 4. **Complete Graded Assignment for Ch. 9:** Answer the five questions below. Upload to BB LMS. **Define** porcelain as it is used in dentistry and what is used for in dentistry. Also list if it can be used in high stress or low stress areas of the mouth. **Define** Feldspathic porcelain and how it is used in dentistry. **Define** Alumina porcelain and how it is made and used in dentisty. **Define** how Leucite-reinforced ceramics are materials reinforced and why this is such an advantage

		in dentistry. List which restorations for which this material works well. **What** is Lithium disilicate ceramic is composed of? What are the results of this glass ceramic? Can this be used in the anterior, posterior parts of the mouth? 5. Using Student Evolve Resources do the Practice Quiz for Ch. 9 6. Study and take online test Ch. 9 **Lab:** • Divide the class into student pairs. Student pairs take turns role playing an assistant helping a dentist in shade taking. Give each pair a shade guide to use in selecting the appropriate shade for the "patient." • Role play explaining the CAD/CAM system for creating crowns • Trim models from last week
Online Test Ch. 9	**17 points**	
Week 10 Course Objectives: 1,2,3,4	**Ch. 10 Dental Amalgam** 1. List the main components in dental amalgam. 2. Describe the advantages of high-copper amalgams over low-copper amalgams. 3. Explain the role of the gamma-2 phase in corrosion of amalgam. 4. Describe the particle shapes in lathe-cut, admix, and spherical alloys, and discuss their effects on the condensation resistance of freshly mixed amalgam.	**Lecture:** Online activities 1. Read/Listen to PPT Ch. 10. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources: ○ Watch Video 10-2 Mixing and Transferring Amalgam

	5. Define creep, corrosion, and tarnish. 6. Compare the strength of amalgam with that of composite resin or glass ionomer cement. 7. Discuss the effect of mixing time on the strength and manipulation of amalgam. 8. Discuss the advantages and disadvantages of amalgam as a restorative material. 9. Discuss the safety of amalgam as a restorative material. 10. Perform safe mercury hygiene practices in the dental office. 11. Collect and process amalgam scrap for recycling.	○ Video 10-5 Dental Assisting: Assisting with Amalgam Restoration 3. Answer Review Questions in text for Ch. 10 **4. Complete Graded Assignment for Ch. 10- Online Discussion** Read the scenario below. Respond as if you were explaining to this patient why it is acceptable for Dr. Roberts to use amalgam for these restorations. Also, address what other options there are to restore these teeth and why amalgam is the best option in this case. Once you have posted your entry, respond to two classmates entry. Caleb comes into the office to have some dental work done. He has two very small areas of decay on teeth #1 and #17. Dr. Roberts has recommended amalgam restorations for those teeth. However, Caleb is questioning whether or not amalgam should be used, because he has heard that "it is bad for you." How would you respond? Upload to BB LMS 5. Using Student Evolve Resources do the Practice Quiz for Ch.10 6. Study and take online test. **Lab:** Class activities • Demonstrate how to prepare, mix, deliver, and store restorative and dental materials • Dispose of scrap amalgam in correct container for recycling

		• Continue with alginates, pouring and trimming study models
Online Test Ch. 10	**20 points**	
Week 11 Course Objectives: 1,2,3,4	**Ch. 11 Metals and Alloys** 1. Describe the differences among the types of gold alloy used for dental restorations. 2. Differentiate between high-noble, noble, and base-metal alloys. 3. Describe the properties needed for porcelain bonding alloys. 4. Describe the properties of metals used for casting partial denture frameworks. 5. Explain the biocompatibility issues associated with some alloys. 6. Explain how solders are used. 7. List metals used for solders. 8. Describe how wrought metal alloys differ from casting alloys. 9. Describe the uses of wrought wire. 10. Explain the use of the different types of metal for orthodontic arch wire. 11. Explain the purpose of an endodontic post. 12. Describe the types of materials used for preformed endodontic posts.	Lecture: Online Activities 1. Read/Listen to PPT Ch. 11. Take notes of important concepts or questions you have using the handout provided. 2. Answer Case-based questions 1 - 6 in textbook. Bring to lab for discussion. 3. Answer Review Questions in text for Ch. 11. **4. Complete Graded Assignment for Ch. 11.** The American Dental Association classifies casting alloys by their noble metal content. They are divided into 3 categoris. Create a chart or table classifying casting alloys using information from your textbook or PPT. • Expain the metal content in each category and what they are composed of. • List which classification of metals are used for which purposes. • How do these metals react with the oral cavity? (biocompatibility) • Which metals have a greater tendency to cause allergic reactions and why? • What is wrought metal alloy? Give an example of a specialty dental practice which uses wrought metal alloys.

		5. Using Student Evolve Resources do the Practice Quiz for Ch. 11. 6. Study and take online test Ch. 11. Lab: • Class discussion Case-based questions 1 - 6. • Identify different examples of dental prostheses or • Continue to work on alginates, pouring and trimming models or other lab projects
Online Test Ch. 11	**24 points**	
Week 12 Course Objectives: 1,2,3,4	**Ch. 13 Abrasion, Finishing, Polishing and Cleaning** 1. Define abrasion, finishing, polishing, and cleaning. 2. Discuss the purpose of finishing, polishing, and cleaning of dental restorations and tooth surfaces. 3. Identify and discuss the factors that affect the rate and efficiency of abrasion. 4. Compare the relative ranking of abrasives on restorations and tooth structures. 5. Describe methods by which dental abrasives are applied. 6. Discuss the contraindications to the use of abrasives on tooth structure and restorations. 7. Describe the clinical decisions made to determine which abrasive to use when finishing, polishing, or cleaning dental restorations or tooth structures. 8. Describe the abrasives and the procedures used for finishing and polishing metals, composite, and porcelain.	**Lecture:** Online activities 1. Read/Listen to PPT 13. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources: ○ Watch Video 13-2 Cleaning Removable Partial and Denture Appliances ○ Watch Video 13-3 Composite Finishing and Polishing Using Coated Abrasive Disks 3. Answer Review Questions in text for Ch. 13. 4. Complete Graded Assignment for Ch. 13. -Define abrasion, finishing, polishing, and cleaning. Explain the purpose of each.

	9. Describe the abrasives and the procedures used for polishing and cleaning metals, composite, ceramic, and gold alloys as part of oral prophylaxis. 10. Describe the safety and infection control precautions taken by the operator when using abrasives. 11. Relate the instructions given to patients to prevent and remove stain from tooth surfaces and restorations.	-Describe the clinical decisions made to determine which abrasive to use when finishing, polishing, or cleaning dental restorations or tooth structures. Upload to BB LMS 5. Using Student Evolve Resources do the Practice Quiz for Ch.13. 6. Study and take online test for Ch. 13. Lab: • Clean and polish fixed/removable appliances and prostheses • Use different abrasives, note the factors that affect the rate of abrasion on different materials, such as metals and composites. • Continue with lab projects
Online Test Ch. 13	**20 points**	
Week 13 Course Objectives: 1,2,3,4	**Ch. 14 Dental Cements** 1. Compare the various types of cements for: • Pulpal protection • Luting • Restorations • Surgical dressing 2. Describe the properties of cement, and explain how these properties affect selection of cement for a dental procedure. 3. Identify the components of the various dental cements. 4. Describe how the components of various dental cements affect the properties of the cement. 5. Compare the advantages and disadvantages of each cement.	**Lecture:** Online activities 1. Read/Listen to PPT. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources: ○ Video 14-1 Mixing and Placing Zinc Oxide Eugenol for a Temporary Filling ○ Video 14-2 Mixing Zinc Phosphate Cement for Luting 3. Answer Review Questions in text for Ch. 14.

	6. Describe the manipulation considerations for mixing cements. 7. Describe the procedure for filling a crown with luting cement. 8. Describe the procedure for removing excess cement after cementation. 9. Apply the mixing technique for each type of cement.	**4. Complete Graded Assignment for Ch. 14.** List the advantages and disadvantages of zinc oxide eugenol, zinc phosphate, zinc polycarboxylate, traditional glass ionomer, hybrid ionomer, and resin-based cements. Include: • liquid/powder ratio (if applicable) • mixing time • temperature • what it is mixed on • mixing method • setting time 5. Using Student Evolve Resources do the Practice Quiz for Ch. 14. 6. Study and take online test Ch. 14. **Graded Assignment:** List the advantages and disadvantages of zinc oxide eugenol, zinc phosphate, zinc polycarboxylate, traditional glass ionomer, hybrid ionomer, and resin-based cements. Include: • liquid/powder ratio (if applicable) • mixing time • temperature • what it is mixed on • mixing method • setting time **Lab:** Practice the mixing technique for each type of cement • Procedure 14.1: Zinc Oxide Eugenol Cement (ZOE):

		Primary and Secondary Consistency • Procedure 14.2: Zinc Phosphate Cement: Primary Consistency • Procedure 14.3: Zinc Polycarboxylate Cement: Primary Consistency • Procedure 14.4: Glass Ionomer Cement: Predosed Capsule • Procedure 14.5: Resin-Based Cement for Indirect Restorations: Ceramic, Porcelain, Composite • Procedure 14.6: Self-Adhesive Technique for Indirect Restorations: Ceramic, Porcelain, Composite
Online Test Ch. 14	25 points	
Week 14 Course Objectives: 1,2,3,4	**Ch. 17 Polymers for Prosthetic Dentistry** 1. Describe the formation of long-chain polymers from monomers. 2. Explain the effect that cross-linking has on the physical and mechanical properties of polymers. 3. Describe the stages of addition polymerization. 4. Explain the function of a free radical. 5. List the important properties of acrylic resins. 6. Describe the procedure for heat processing a denture. 7. Compare the properties of hard and soft lining materials. 8. List the indications for long- and short-term soft liners. 9. Compare the advantages and disadvantages of chairside and laboratory-processed hard liners.	Lecture: Online activities 1. Read/Listen to PPT Ch. 17. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources: ○ Watch Video 17-1 Custom Tray Construction 3. Answer Review Questions in text for Ch. 17. **Complete Graded Assignment for Ch. 17.** Scenario: Your patient just received a new acrylic resin denture. Explain in detail who they should care for their new appliance. Explain how to clean it, how to store it when they aren't wearing it. Include

	10. List the indications for the use of acrylic denture teeth versus porcelain teeth. 11. Use an ultrasonic cleaner for cleaning complete and partial dentures in the office. 12. Educate patients regarding the home care regimen they should follow for complete and partial dentures. 13. Inform patients of the precautions they should take when cleaning their dentures. 14. Fabricate custom impression trays for upper and lower arches. 15. Fabricate record bases for complete dentures, using light-cured material.	supplies they will need. Also, list precautions for patients with dentures. Upload to BB LMS. 4. Using Student Evolve Resources do the Practice Quiz for Ch. 17, 5. Study and take online test. Lab: • Create custom trays • Mix cements
Online Test Ch. 17	25 points	
Week 15 Course Objectives: 1,2,3,4	**Ch. 19 Preventive & Corrective Oral Appliances** 1. Describe the uses of mouth guards. 2. List the materials for the fabrication of mouth guards. 3. Explain to a patient how to care for a mouth guard. 4. Fabricate a sports mouth guard. **Ch. 8 Fabrication of Custom Whitening Trays-** if there is time. Otherwise complete in Expanded Functions	**Lecture:** Online activities 1. Read/Listen to PPT Ch. 19. Take notes of important concepts or questions you have using the handout provided. 2. Using Evolve Student Resources: ○ Watch Video 19-1 Sports Mouthguard (Patient Education) 3. Answer Review Questions in text for Ch. 19. **4. Complete Assignment for Ch. 19.** Answer the following critical thinking question: Caleb is a football player who wears a mouthpiece with his football helmet to protect his teeth from any trauma. The mouthpiece came with the helmet and covers both the maxillary and mandibular teeth.

		Caleb has been complaining about the gum tissue on the lower right side of his mouth hurting. Upon an examination at the dental office, the dentist discovers a sore in the vestibule of the mandibular right side of Caleb's mouth. -List the three main types of mouthguards. -What could be causing the sore in Caleb's mouth? -Why is a custom-made mouthguard better than a stock guard? Post to Assignments on BB LMS. 5. Using Student Evolve Resources do the Practice Quiz for Ch. 19 6. Study for test Ch. 19, which will be included in the final exam. **Lab:** • Fabricate a Sports Mouth Guard • Procedure 8.3 Fabricaton of Cusom Whitening Trays • Mix cements • Complete any outstanding competencies
Week 16 Course Objectives: 1,2,3,4	Review for final exam	**Lab: Competencies** on mixing cements All lab competencies must be completed and turned in to receive credit
Final exam week	**Final exam comprehensive** **100 points**	