Course Outline

DIVISION: Health Professions

Course: DLA1201- Dental Materials

Date: Fall 2009

Semester Hours: 4

Prerequisite(s): Admission to the Dental Assisting Program

Delivery Method:

- Lecture 2 Credit Hours
- Lab 4 Credit Hours

Offered: Fall

IAI Equivalent –Only for Transfer Courses-go to http://www.itransfer.org:

CATALOG DESCRIPTION:

This course stresses the physical properties, manipulation and applications of gypsum products, restorative materials, cements, impression materials, waxes, abrasives, preventive materials, and bleaching materials.
GENERAL EDUCATION GOALS ADDRESSED
[See the last page of this form for more information.]

Upon completion of the course, the student will be able:
[Choose those goals that apply to this course.]

☒ To apply analytical and problem solving skills to personal, social and professional issues and situations.
☒ To communicate orally and in writing, socially and interpersonally.
☐ To develop an awareness of the contributions made to civilization by the diverse cultures of the world.
☐ To understand and use contemporary technology effectively and to understand its impact on the individual and society.
☒ To work and study effectively both individually and in collaboration with others.
☒ To understand what it means to act ethically and responsibly as an individual in one’s career and as a member of society.
☒ To develop and maintain a healthy lifestyle physically, mentally, and spiritually.
☒ To appreciate the ongoing values of learning, self-improvement, and career planning.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:
[Outcomes related to course specific goals.]

Upon completion of the course, the student will be able to:

II. EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

Upon completion of the course, the student will be able to:

1. Demonstrate a basic understanding of the properties required of dental materials.
   1.1 Identify the role of the ADA Council on Dental Materials and Devices.
   1.2 List the qualities of the oral environment that make it challenging for long-term clinical performance of dental materials.
   1.3 Identify the following terms: force, stress, strain, elasticity, elastic limit, and ultimate strength.
   1.4 Differentiate between ductility and malleability
   1.5 Describe thermal conductivity and thermal expansion and state why these are important in dentistry.
II. EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES: (con’t)

1.6 Discuss adhesion in terms of: viscosity, contact angle, wetting ability, film thickness, and surface tension.

1.7 Discuss solubility and sorption of dental materials.

1.8 Define biocompatibility and discuss why requirements for biocompatibility may fluctuate in the mouth.

2. Demonstrate a basic understanding of the properties and manipulation of gypsum products.

2.1 Differentiate between dental plaster and dental stone in terms of: how they are manufactured from solid gypsum, technical name, crystalline structure, and uses in the dental office.

2.2 Describe how powdered dental plaster and stone are reformed into solid gypsum including: correct water/powder ratio, setting time, mixing techniques, setting expansion, final strength, and dimensional stability.

2.3 Mix dental plaster and stone properly, pour it into an impression with the aid of a vibrator, and separate the impression from the set gypsum material without distorting the gypsum. Trim casts.

2.4 Discuss the effects of manipulative variables on the properties of the gypsum product.

2.5 Discuss the process of fabricating metal-plated and epoxy dies.

3. Demonstrate a basic understanding of the selection, types, composition, and manipulation of dental cements.

3.1 Discuss the uses of cements in dentistry for pulpal protection, luting, restorations, and surgical dressings.

3.2 Compare the following dental cements in terms of composition, characteristics, and uses in dentistry: zinc oxide-eugenol, zinc phosphate, polycarboxylate, glass ionomer, and hybrid ionomer.

3.3 Prepare dental cements, according to manufacturer’s specifications, for chairside application.

3.4 Discuss the effects of manipulative variables on the properties of each cement.

3.5 Compare the following cavity liners in terms of composition, characteristics, and uses: calcium hydroxide, zinc oxide-eugenol, cavity varnish, and glass ionomer.

3.6 Prepare cavity liners, according to the manufacturer’s specifications, for chairside application.
3.7 Discuss special applications of cements, such as: root canal sealer, periodontal dressing, gingival tissue pack, orthodontic band and bracket placement, and ceramic or composite appliance cementation.

3.8 Discuss the advantages and disadvantages of each dental cement.

II. EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES: (con’t)

4. Demonstrate a basic understanding of the types, selection, composition, and manipulation of restorative materials.
   4.1 Describe the desirable qualities that aid in the selection of restorative materials.
   4.2 Discuss the effects of manipulative variables on the properties of each restorative material.
   4.3 Discuss the composition of direct esthetic restorative materials and dental amalgam.
   4.4 Prepare restorative materials, according to the manufacturer’s specifications, for chairside application.
   4.5 Discuss various bonding agents and bonding systems used with restorative materials.
   4.6 Discuss the effects of acid etching on enamel and dentin.
   4.7 Discuss the factors that interfere with good bonding.
   4.8 Discuss finishing procedures used with restorative materials.
   4.9 Discuss and practice proper mercury hygiene procedures.

5. Demonstrate a basic understanding of the types, selection, composition, and manipulation of dental impression materials.
   5.1 List the properties of each type of impression material.
   5.2 Discuss impression plaster, metallic oxide, and impression compound in terms of composition, characteristics, and uses in dentistry.
   5.3 Compare agar impression materials and alginate impression materials in terms of composition, characteristics, and uses in dentistry.
   5.4 Compare polysulfide, silicone, and polyether impression materials in terms of composition, characteristics, and uses in dentistry.
   5.5 Prepare impression materials, according to the manufacturer’s specifications, for chairside application.
5.6 Discuss the advantages and disadvantages of each impression material.
5.7 Discuss the effect of manipulative variables on the properties of each impression material.
5.8 Select appropriate stock trays, prepare alginate impression material, and take satisfactory impressions for study models on a patient.
5.9 Prepare bite registration materials and record an accurate bite on a patient.
5.10 Discuss the infection control procedures that must be followed before, during, and after impressions are taken.

6. Demonstrate a basic understanding of the types, selection, properties, and manipulation of plastics in prosthetics.
6.1 List the properties of plastics.

II. EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES: (con’t)

6.2 Identify the various applications of plastics in dentistry.
6.3 Discuss the composition and polymerization of plastics.
6.4 Discuss the manipulation and processing procedures for the various types of plastics.

7. Demonstrate a basic understanding of the types, selection, composition, and manipulation of dental waxes.
7.1 Describe the composition, form and primary uses of the following waxes: inlay wax, casting wax, baseplate wax, boxing wax, utility wax, and sticky wax.
7.2 Identify the properties of waxes and their clinical/laboratory significance.
7.3 Differentiate between direct and indirect waxings and identify which property of dental waxes is most important in their difference.
7.4 Manipulate dental waxes in the laboratory to complete assigned projects.
7.5 Obtain a bite registration using bite registration wax.

8. Demonstrate a basic understanding of the types and uses of preventive dental materials.
8.1 Discuss the composition, use and manipulation of pit and fissure sealants.
8.2 Apply pit and fissure sealants correctly.
8.3 Discuss the types of mouth protectors available and the fabrication process of each type.
8.4 List the various materials used for treating sensitive teeth and explain how desensitizing agents work.
8.5 Describe the methods used to bleach teeth.
8.6 Explain the differences between professionally supervised home bleaching and over-the-counter systems.
8.7 Fabricate custom trays for home bleaching.

9. Demonstrate a basic understanding of abrasive materials and their usage.

9.1 Define abrasion, finishing, polishing, and cleansing.
9.2 Discuss the purpose of finishing, polishing, and cleansing of dental restorations and tooth surface.
9.3 Identify the methods by which abrasives are applied.
9.4 List the contraindications to the use of abrasives on tooth structure and restorations.
9.5 Describe the abrasives used and procedure for polishing and cleansing metals, composite, porcelain, and gold alloys as part of an oral prophylaxis.
9.6 Describe the abrasives used and procedure for finishing and polishing metals, composite, and porcelain.

II. EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES: (con’t)

10. Identify and implement safety measures when using laboratory equipment.

COURSE TOPICS AND CONTENT REQUIREMENTS:
III. COURSE CONTENT:

I. Properties of Dental Materials
   A. Council of Dental Materials and Devices
      1. Certification of materials
      2. Acceptance of materials
   B. Factors that make demands on dental materials
   C. Properties of dental materials
      1. Mechanical properties
      2. Electrical properties
      3. Thermal properties
4. Adhesion
5. Solubility and sorption
6. Wettability

II. Gypsum Products
   A. Types and selection
      1. Dental plaster
      2. Class I stone
      3. Class II stone
   B. Properties
   C. Chemical and physical nature
   D. Manipulation
   E. Metal-plated and epoxy dies

III. Dental Cements
   A. Types of cements
   B. Desirable qualities of cements
   C. Uses of cements
   D. Composition and reaction of cements
   E. Manipulation of cements
      1. Zinc oxide-eugenol
      2. Zinc phosphate
      3. Polycarboxylate
      4. Hybrid ionomer
      5. Glass ionomer
   F. Cavity liners and varnishes
      1. Types and selection
      2. Manipulation
   G. Special applications of cements

IV. Restorative Materials
   A. Types of restorative materials

III. COURSE CONTENT: (con’t)
   B. Uses of restorative materials
   C. Desirable qualities of restorative materials
   D. Composition of restorative materials
   E. Manipulation of restorative materials
      1. Amalgam
      2. Composite
      3. Glass ionomer
   F. Bonding agents and systems
G. Mercury hygiene techniques

V. Impression Materials
A. Properties of impression materials
B. Types of impression materials
C. Uses of impression materials
D. Composition of impression materials
E. Manipulation of impression materials
   1. Impression plaster
   2. Zinc oxide
   3. Compound
   4. Hydrocolloids
   5. Polysulfide
   6. Silicone
   7. Polyether
F. Materials for bite registration
G. Infection control considerations

VI. Plastics in Prosthetics
A. Types of plastics
B. Properties of plastics
C. Uses of plastics
D. Composition and polymerization of plastics
E. Manipulation and processing of plastics

VII. Dental Waxes
A. Composition of waxes
B. Types of waxes
   1. Pattern
      a. Inlay
      b. Casting
      c. Baseplate
   2. Processing
      a. Boxing
      b. Utility
      c. Sticky
   3. Impression
      a. Bite registration

III. COURSE CONTENT: (con’t)

b. Corrective

C. Use of waxes
D. Manipulation of waxes

VIII. Preventive dental materials
A. Pit and fissure sealants
   1. Composition
   2. Manipulation
B. Mouth protectors
   1. Types
   2. Composition
   3. Fabrication process
C. Desensitizing agents
   1. Composition
   2. Indications for use
D. Bleaching methods
   1. In-office bleaching
   2. Home bleaching
   3. Over-the-counter bleaching

IX. Abrasive materials
A. Finishing and Polishing
   1. Factors affecting abrasion
   2. Design and delivery of abrasives
   3. Materials used as abrasives
   4. Amalgam, composite, gold alloy, porcelain
B. Polishing during Oral Prophylaxis
   1. Amalgam
   2. Composite
   3. Gold Alloy
   4. Porcelain
   5. Resin Cement Interface
   6. Air polishing/air abrasion

INSTRUCTIONAL METHODS:
IV. INSTRUCTIONAL METHOD:

  Lecture

  Class discussions

  Visual aids - videos, transparencies

  Demonstrations

  Laboratory projects
IV. INSTRUCTIONAL METHOD: (con’t)

Actual practice using dental materials and equipment

Computers - tutorial software

Exams and quizzes

INSTRUCTIONAL MATERIALS:

Video series: Manipulation of Cements
Taking Alginate Impressions

Computer tutorials: Abrasive Materials
Amalgam
Composite
Gypsum Products
Introduction to Dental Materials
Pit & Fissure Sealants
Varnishes, cements, liners
Waxes

Laboratory materials, equipment, and miscellaneous supplies

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:
Lecture: Reading assigned materials, note taking and participation in classroom discussion is expected.

Written examinations are used to evaluate student progress following each unit. A comprehensive final exam will be given at the end of the semester. All of the grades from these exams will be averaged equally to determine the student’s final lecture grade.

Laboratory: Students are required to complete all assigned projects.
Students are required to mix the various dental materials for evaluation by an instructor.

Students are responsible for the cleanliness of the laboratory and must follow the posted laboratory rules.

Final Grade: A grade of “C” is required in the lecture portion and in the laboratory portion of this course for graduation from the Dental Assisting Program.

The student's final grade will be calculated: 50% lecture grade 50% laboratory grade

The following grading scale will be used as a guide in determining the grade for this course:

A= 90 - 100%
B= 80 - 89%
C= 70 - 79%
D= 60 - 69%
F= 0 - 59%

For attendance and testing policies, see the Dental Assisting Student Handbook

OTHER REFERENCES

References:


Form Revised: 3/2/05