



program SLOS this course supports.

- This course outline is standardized and/or the result of a community college or system-wide agreement.  
Responsible committee:
5. Student Learning Outcomes (SLOs): List one to four inclusive SLOs.  
*For assessment, link these to #7. Recommended Course Content, and #9. Recommended Course Requirements & Evaluation. Use roman numerals (I., II. III.) to designate SLOs*  
On successful completion of this course, students will be able to:
- I. Identify the structure and composition of various materials used in dentistry;
  - II. Identify the uses, manipulations, and properties of various materials used in dentistry;
  - III. Demonstrate competency in manipulation of various materials used in dentistry.
  - IV.
6. Competencies/Concepts/Issues/Skills  
*For assessment, link these to #7. Recommended Course Content, and #9. Recommended Course Requirements & Evaluation. Use lower case letters (a., b., c...n.)to designate competencies/skills/issues*  
On successful completion of this course, students will be able to:

#### Introduction to Dental Materials

- a. Explain the importance of the study and understanding the uses of dental materials for the dental assistant.
- b. List the general uses and categories of dental materials.
- c. List and describe the properties of dental materials, including considerations of their use in dentistry.
- d. Describe the use, necessity, rationale, and components of universal (standard precautions and personal protective equipment (PPE) when performing invasive dental procedures or working with dental materials and when performing related laboratory procedures.
- e. Relate the importance of communication with the commercial dental laboratory, maintaining a case tracking system, handling of impressions, prosthesis, and appliances before and after patient treatment.
- f. Describe the role of the dental assistant relevant to ordering dental supplies and materials, inventory control, and shelf life.
- g. List the qualities of the oral environment that make it challenging for long term clinical performance of dental materials.
- h. Define stress, strain, and ultimate strength.
- i. Describe the effects of moisture and acidity on dental materials.
- j. Define thermal conductivity and thermal expansion and contraction.
- k. Describe the process used to achieve mechanical, chemical, and bonding retention.
- l. Describe microleakage and how the results of this process can lead to recurrent decay and postoperative sensitivity.
- m. Define biocompatibility.

#### Principles of Bonding

- n. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, and application of acid etch and bonding agents.
- o. Discuss the effects of acid etching on enamel and dentin.
- p. Describe the basic steps of bonding
- q. Describe the agents used for bonding.

- r. Discuss factors that interfere with good bonding.
- s. Describe the amalgam bonding technique.
- t. Explain differences in bonding to enamel, dentin, metal, and porcelain.
- u. List the factors that contribute to tooth sensitivity after bonding.

#### Direct and Indirect Esthetic and Restorative Materials

- v. Describe the various types of composite resin restorative materials.
- w. Discuss the uses, advantages, and disadvantages of each type of composite resin.
- x. Discuss the procedural differences between direct and indirect composite restorations.
- y. Describe the composition of glass ionomer restoratives and their uses, advantages, and disadvantages.
- z. Explain the effect of fluoride releasing, resin-modified glass ionomer restorations on prevention of recurrent decay.

#### Fluoride and Sealants in Prevention

- aa. Describe the use of fluoride in prevention.
- bb. Explain how fluoride protects teeth from caries.
- cc. Discuss the various methods for fluoride delivery.
- dd. Discuss the use of sealants for prevention of pit and fissure caries.

#### Amalgam and Composite Materials

- ee. Discuss the general types of restorative materials used in dentistry and their specific applications.
- ff. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when placing amalgam restorations.
- gg. Describe the role and duties of the dental assistant in safe handling of mercury, the principles of mercury hygiene, and the necessary steps required to safely clean up a mercury spill.
- hh. Discuss the safety of amalgam as a restorative material.
- ii. List the main components in dental amalgam.
- jj. Define creep, corrosion, and tarnish.
- kk. Describe the different types of metals used for dental implants.
- ll. Explain the purpose of a post.
- mm. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when placing composite restorations.
- nn. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when placing glass ionomer restorations.

#### Finishing and Polishing

- oo. Define and discuss abrasion, finishing, polishing, and cleansing.
- pp. Describe the abrasives used and procedure for finishing and polishing metals, composite, and porcelain.

#### Dental Cements

- qq. Discuss the uses of cements in dentistry for pulpal protection, luting, restorations, and surgical dressing.
- rr. Describe the properties of cement and how these properties affect selection of a cement for a dental procedure.
- ss. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when using zinc phosphate cement.

- tt. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when using zinc oxide eugenol.
- uu. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when using polycarboxylate cement.
- vv. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when using glass ionomer cement.
- ww. Discuss the mixing technique for temporary cement (Temp Bond).

#### Impression Materials

- xx. Describe the general types of impression materials used in dentistry and their specific applications.
- yy. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when working with hydrocolloid impression (irreversible and reversible) materials.
- zz. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when working with polysulfide elastomeric impression materials.
- aaa. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when working with condensation silicone and addition polysiloxane/ polyvinyl elastomeric impression materials.
- bbb. Describe the role and duties of the dental assistant in the use, instrumentation, manipulation, application, and clean-up procedures required when working with polyether impression materials.
- ccc. Describe the role and duties of the dental assistant in disinfection of various dental impression materials.
- ddd. Describe the role and duties of the dental assistant in procedures required when working with bite registration paste.

#### Dental Wax

- eee. Identify the common components of dental waxes.
- fff. Identify the properties of waxes.
- ggg. Describe the role and duties of the dental assistant in the care, storage, and handling of dental waxes.
- hhh. Describe specific disinfection procedures as they relate to waxes used in dental procedures.
- iii. Differentiate between direct and indirect waxings.

#### Gypsum Products

- jjj. Describe the role of the dental assistant in the use, composition, and properties of plaster and stone (gypsum materials) used in dentistry.
- kkk. Describe the steps required for the dental assistant to pour and trim study models for diagnostic purposes.
- lll. Differentiate between negative and positive reproduction.
- mmm. Differentiate between diagnostic casts, working casts, and dies.

#### Polymers for Prosthetic Dentistry

- nnn. Describe the formation of long-chain polymers from monomers.
- ooo. Describe the stages of addition polymerization.
- ppp. List the important properties of acrylic resins.
- qqq. Explain the difference between hard and soft liners.
- rrr. Describe the advantages and disadvantages of chairside and laboratory hard liners.

sss. Describe the home care regimen for complete and partial dentures that patients should follow.

#### Dental Resins and Provisional Restoration

ttt. State the purpose of the provisional restoration.

uuu. List examples of circumstances that may require provisional coverage.

vvv. List the advantages and disadvantages of preformed and custom crowns.

www. Describe the role of the dental assistant in fabricating temporary (provisional) acrylic restorations.

#### Bleaching Materials

xxx. Describe the methods used to bleach teeth.

yyy. Discuss the similarities and differences among the materials used to bleach teeth.

zzz. Explain the differences between professionally supervised home bleaching and over-the-counter systems.

aaaa. Describe the role of the dental assistant in fabricating self-curing custom resin trays, light-cured custom resin trays, vacuum formed custom trays, and thermoplastic custom trays.

### CLINICAL COMPETENCIES

#### Impression Materials

bbbb. Demonstrate various mixing techniques and manipulation for dental materials.

cccc. Demonstrate how to take an alginate impression suitable for diagnostic casts.

dddd. Demonstrate tray selection for an alginate impression.

eeee. Demonstrate mixing alginate, loading and seating the tray, and removing the impression.

ffff. Demonstrate proper handling of alginate impression.

gggg. Demonstrate tray selection for an edentulous impression.

#### Bonding

hhhh. Demonstrate procedures for bonding to enamel and dentin.

#### Direct and Indirect Esthetic and Restorative Materials

iiii. Demonstrate how to place a composite resin restoration in a prepared typodont tooth.

jjjj. Demonstrate steps to be taken to ensure proper conditions for shade taking.

kkkk. Demonstrate how to apply sealants on a prepared typodont tooth.

#### Amalgam and Composite Materials

llll. Demonstrate how to properly mix and place amalgam in a prepared typodont tooth.

#### Finishing and Polishing

mmmm. Finish and polish a pre-existing amalgam restoration.

nnnn. Polish a pre-existing composite restoration.

#### Dental Cements

oooo. Apply the mixing technique for zinc oxide eugenol cement (ZOE).

pppp. Apply the mixing technique for glass ionomer lining cement.

qqqq. Apply the mixing technique for glass ionomer luting cement (Ketac-Cem).

rrrr. Apply the mixing technique for calcium hydroxide liner (Dycal).

ssss. Apply the mixing technique for temporary cement (Temp Bond).

tttt. Apply the mixing technique for zinc phosphate cement.

### Additional Impression Materials

- uuuu. Apply the mixing technique for polyether impression material.
- vvvv. Apply the mixing technique for vinyl polysiloxane impression material.
- www. Apply the mixing technique for polysulfide impression material.
- xxxx. Apply the mixing technique for polyvinyl siloxane (PVS) impression material (express or extrude) using the putty/wash technique.

### Dental Wax

- yyyy. Demonstrate how to obtain a wax bite registration.

### Gypsum Products

- zzzz. Obtain, pour, and trim study models for diagnostic purposes.
- aaaa. Demonstrate differences between negative and positive reproductions.

### Polymers for Prosthetic Dentistry

- bbbb. Perform a denture repair and polish acrylic.
- cccc. Fabricate a custom tray from an edentulous cast.
- dddd. Mount upper model on an articulator.

### Dental Resins and Provisional Restoration

- eeee. Fabricate a custom provisional crown.

### Bleaching Materials

- ffff. Fabricate custom bleaching trays from stone casts using thermoplastic vinyl tray material.
- gggg. Fabricate a sports mouth guard.

## 7. Suggested Course Content and Approximate Time Spent on Each Topic

*Linked to #5. Student Learning Outcomes and # 6 Competencies/Skills/Issues*

- 1 week Introduction to Dental Materials, Principles of Bonding (I, II, III, a, b, c, d, e, f, g, h, i, j, k, l, m n, o, p, q, r, s, t, u, hhhh)
- 1 week Amalgam and Composite Materials, Direct and Indirect Esthetic and Restorative Materials (I, II, III, v, w, x, y, z, ee, ff, gg, hh, ii, jj, kk, ll, mm, nn, iii, jjjj, kkkk, llll)
- 1 week Fluoride and Sealants in Prevention (I, II, III, aa, bb, cc, dd)
- 1 week Finishing and Polishing (I, II, oo, pp, mmmm, nnnn)
- 1 week Dental Cements (I, II, III, qq, rr, ss, tt, uu, vv, ww, oooo, pppp, qqqq, rrrr, ssss, tttt)
- 4 weeks Impression Materials (I, II, III, xx, yy, zz, aaa, bbb, ccc, ddd, bbbb, cccc, dddd, eeee, ffff, gggg, uuuu, vvvv, www, xxxx)
- 1 week Dental Wax (I, II, III, eee, fff, ggg, hhh, iii, yyyy)
- 2 weeks Gypsum Products (I, II, III, jjj, kkk, ll, mmm, zzzz, aaaaa)
- 1 week Polymers for Prosthetic Dentistry (I, II, III, nnn, ooo, ppp, qqq, rrr, sss, bbbbbb, ccccc, ddddd)
- 1 week Dental Resins and Provisional Restoration (I, II, III, tt, uu, vv, www, eeeee)
- 1 week Bleaching Materials (I, II, III, xxx, yyy, zzz, aaaa, fffff, ggggg)

## 8. Text and Materials, Reference Materials, and Auxiliary Materials

Appropriate text(s) and materials will be chosen at the time the course is offered from those currently available in the field. Examples include: Hatrick, C. et al., *Dental Materials: Clinical Applications for Dental Assistants and Dental Hygienists*, current edition, Elsevier.

Bird, D. and Robinson, D., Torres and Ehrlich Modern Dental Assisting, current edition, Elsevier.

Bird, D. and Robinson, D., Student Workbook to Accompany Torres and Ehrlich Modern Dental Assisting, current edition, Elsevier.

Appropriate reference materials will be chosen at the time the course is offered from those currently available in the field. Examples include: Boyd, L., Dental Instruments: A Pocket Guide, current edition, Elsevier.

Durley, C. et al., The DANB Review, current edition, Dental Assisting National Board.

Durley, C. et al., DANB's Glossary of Dental Assisting Terms, current edition, Dental Assisting National Board.

Finkbeiner, B., Four-Handed Dentistry: A Handbook of Clinical Application and Ergonomic Concepts, current edition, Prentice Hall.

Massler, M. and Schour, I., Atlas of the Mouth, current edition, American Dental Association.

Miller, B. et al., Miller-Keane Encyclopedia and Dictionary of Medicine, Nursing and Allied Health, current edition, Elsevier.

Mosby et al., Mosby's Dental Dictionary, current edition, Elsevier.

Mosby et al., Review Questions and Answers for Dental Assisting, current edition, Elsevier.

Appropriate auxiliary materials will be chosen at the time the course is offered from those currently available in the field. Examples include: State of Hawaii Department of Commerce and Consumer Affairs, Hawaii Administrative Rules Title 16, Chapter 79, Dentists and Dental Hygienists.

State of Hawaii Department of Commerce and Consumer Affairs, Hawaii Revised Statutes Chapter 448, Dentistry.

## 9. Suggested Course Requirements and Evaluation

*Linked to #5. Student Learning Outcomes (SLOs) and #6 Competencies/Skills/Issues*

Specific course requirements are at the discretion of the instructor at the time the course is being offered. Suggested requirements might include, but are not limited to:

- Prompt attendance is required at all class sessions. (I, II, III, a - ggggg)
- Students will be responsible for completing all assigned reading material in text before each class session. (I, II, III, a - ggggg)
- Complete various learning skills exercises. (I, II, III, a - ggggg)
- Complete various competency exercises. (I, II, III, a - ggggg)
- Complete various laboratory exercises. (I, II, III, bbbb - ggggg)
- Complete all projects. (I, II, III, a - ggggg)

## EVALUATION AND GRADING

Quizzes & weekly proficiencies	20% (I - III, a - ggggg)
Midterm	15% (I, II, a - aaaa)
Final exam	25% (I, II, a - aaaa)
Final lab OSCE (Objective Structured Clinical Examination)	25% (I - III, bbbb - ggggg)
Attendance/ Attitude/ Preparation	15% (I - III, a - ggggg)

### 10. Methods of Instruction

Instructional methods will vary considerably by instructor. Specific methods are at the discretion of the instructor teaching the course and might include, but are not limited to:

- Participation in class lecture/ discussion.
- Reading assigned portions in textbooks, journal articles, and/ or modules.
- Viewing various audiovisual materials.
- Demonstration and simulation.
- Supervised lab practice.
- Supervised clinical practice.
- Discovery learning.
- OSCE.

### 11. Assessment of Intended Student Learning Outcomes Standards Grid attached