Wharton County Junior College

Administrative Master Syllabus

Course Information

Course Title	Dental Materials
Course Prefix, Num. and Title	DHGY 1219
Division	Allied Health
Department	Dental Hygiene
Course Type	WECM Course
Course Catalog Description	Physical and chemical properties of dental materials including the application and manipulation of the various materials used in dentistry.
Pre-Requisites	DHYG 1339, 1304, 1261, 1227, and 1207 with a grade of "C" or better.
Co-Requisites	None

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours: Lab/Other Hours	2:1:3
Equated Pay Hours	2.5
Lab/Other Hours Breakdown: Lab Hours	2
Lab/Other Hours Breakdown: Clinical Hours	0
Lab/Other Hours Breakdown: Practicum Hours	0
Other Hours Breakdown	0

Approval Signatures

Title	Signature	Date
Department Head:	Carol Derkowski Digitally signed by Carol Derkowski Date: 2024.06.17 14:10:04 -05'00'	
Division Chair:	Carol Derkowski Digitally signed by Carol Derkowski Date: 2024.06.17 14:10:17 -05'00'	
VPI:	Leigh Ann Collins Digitally signed by Leigh Ann Collins Date: 2024.06.17 15:29:20 -05'00'	

Additional Course Information

Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

DHYG 1219 Dental Materials

Course Outline

I. Introduction
   A. History of Dental Materials
   B. ADA Evaluation Programs
      1. Council on Dental Therapeutics
      2. Council on Dental Materials, Instruments and Equipment

II. Properties of Dental Materials
   A. Physical Considerations
   B. Biological Considerations
   C. Terminology and Concepts
      1. Dimensional Change: shrinkage or expansion
      2. Coefficient of Thermal Expansion
      3. Microleakage & Percolation
      4. Thermal Conductivity
      5. Galvanism
      6. Corrosion & Tarnish
      7. Absorption & Adsorption
      8. Wettability, Hydrophilic, Hydrophobic
      9. Biting Forces
   D. Applications to Dentistry

III. Preventive Dental Materials
   A. Fluoride Gels and Rinses
      1. Composition
         a) APF
         b) Neutral Sodium
         c) Stannous
      2. Properties
         a) Thixotropic
      3. Manipulation
   B. Pit and Fissure Sealants
      1. Indication
      2. Composition and Reaction
         a) Bisphenol A-Glycidyl Methacrylate (BIS-GMA) or Urethane Dimetharylate
         b) Polymerized by light (one component system)
         c) Polymerized by organic amine (two component system)
      3. Properties
         a) Mechanical bonding
         b) Periodic re-evaluation for retention

c) Contraindications

4. Manipulation

C. Mouth Protectors

1. Indications
2. Types and Composition
    a) Stock
    b) Mouth-formed
    c) Custom-made
    d) Thermoplastic polymers
        a. Polyvinylacetate-polyethylene polymer
        b. Polyurethane
        c. Rubber latex
        d. Vinyl Plastisol
3. Properties
4. Fabrication
    a) Custom-made
    b) Mouth-formed
5. Care

IV. Direct Esthetic Restorative Materials

A. Historical Perspective

B. Composite Restoratives

1. Composition and Reaction
    a) Filler Size and Composition
    b) Coupling Agents, Organic Matrix, Pigments
    c) Initiators and Accelerators
2. Composite Systems
    a) Two-paste
    b) Single-paste
3. Properties
    a) Polmerization Shrinkage
    b) Thermal Conductivity
    c) Water Sorption
    d) Radiopacity
    e) Compressive and Tensile Strength
    f) Elastic Modulus
    g) Hardness, Penetration Resistance, Wear
    h) Bond Strength
4. Clinical Qualities
5. Manipulation
    a) Two-paste system
    b) Single-paste system

C. Bonding agents

    a) Restoration of incisals
    b) Core build-up
    c) Temporary bridge construction

d) Repair of porcelain or composite

D. Ionomer Restoratives

V. Dental Amalgams
   A. Definition
   B. Mercury
   C. Silver Alloys
   D. Amalgamation
   E. Properties
      1. Dimensional Change
      2. Strength
      3. Creep
      4. Tarnish and Corrosion
   F. Manipulation
      1. Selection of Product
      2. Mixing Methods
      3. Factors in Mixing
         a) Trituration
         b) Undermix, normal mix, overmix
      4. Condensation
      5. Finishing
   G. Bonding Amalgam to Tooth Structure

VI. Finishing, Polishing and Cleansing Materials
   A. Definitions
   B. Abrasion
      1. Rate
      2. Types
      3. Finishing, Polishing Techniques
         a) Gold Alloy
         b) Denture Base
         c) Composite Restorative Materials
         d) Hybrid Ionomers
   C. Prophylactic Pastes
      1. Composition
      2. Properties
   D. Dentifrices
      1. Composition and Role of Ingredients
      2. Selection of Toothbrush and Dentifrice
   E. Denture Cleaners
      1. Requirements
      2. Types
      3. Effectiveness
      4. Recommended Techniques and Precautions
   F. Bleaching
      1. Composition
      2. Properties

3. Techniques

VII. Cements
- A. Definitions
- B. Cementation Composition & Reaction, Properties & Manipulation
  1. Zinc Phosphate Cement
  2. Zinc Oxide-Eugenol Cements
  3. Zinc Polycarboxylate Cements
  4. Glass Ionomer Cements
  5. Hybrid Ionomer Cements
  6. Composite & Adhesive Resin Cements
  7. Compomer Cement
- C. High-Strength Bases
  1. Properties
  2. Manipulation
- D. Temporary Fillings
- E. Low-Strength Bases Composition & Reaction, Properties & Manipulation
  1. Calcium Hydroxide Cement
  2. Resin Cement
  3. Zinc Oxide-Eugenol Cement
- F. Cavity Liners and Varnishes
- G. Special Application of Cements

VIII. Impression Material
- A. Definition
- B. Rigid
  1. Dental Impression Compound
  2. Impression Plaster
  3. Zinc Oxide-Eugenol Impression Material
- C. Hydrocolloids
  1. Alginate Impression Material
  2. Agar Hydrocolloid Impression Material
  3. Agar-Alginate Impression Material
- D. Elastomeric Impression Materials
  1. Polysulfide Rubber Impression Materials
  2. Silicone Rubber Impression Materials
     a) Condensation Type
     b) Addition Type
  3. Polyether Rubber Impression Materials
- E. Disinfection of Rubber Impressions
- F. Rubber Materials for Bite Registration

IX. Model and Die Materials
- A. Definitions
- B. Types and Selection, Manipulation and Properties
  1. Gypsum Products
     a) Model Plaster (type II)

b) Dental Stone (type III)
c) Dental Stone, High Strength (type IV)

2. Metal
a) Electroplated Copper
b) Electroplated Silver

3. Resin
a) Epoxy

X. Waxes
A. Properties & Composition
B. Types
1. Patter Wax
a) Inlay, Casting & Baseplate
2. Processing Wax
a) Boxing Wax
b) Utility Wax
c) Sticky Wax
d) Corrective Impression Wax
e) Bite Registration Wax

XI. Gold & Nonprecious Alloys
A. Definition & Gold Content
1. Noble Metals & Base Metals
B. Gold Alloys
1. Porcelain-Fused-to-Metal
2. White Gold Alloys
3. Cobalt-Chromium
4. Titanium
C. Biocompatibility of Alloys
D. Solders
1. Brazing
2. Fluxes

XII. Dental Casting of Metals
A. Definitions
B. Wax Pattern
C. Spruing
D. Investing
E. Investment Expansion
F. Wax Elimination
G. Casting the Alloy

XIII. Plastics in Prosthetics
A. Polymerization Process
B. Vinyl Plastics
C. Acrylic Plastics as Denture Bases
1. Composition
2. Properties

a) Room Temperature-Processed Acrylic Dentures

3. Care of Dentures

D. Plastics as Soft Liners

1. Home Reliners

E. Plastics as Prosthetic Teeth

F. Plastic-Metal Combinations

G. Light-Cured Dimethacrylates

H. Other Uses of Plastics in Dentistry

1. Maxilofacial Materials
2. Temporary Crown and Bridge Materials
3. Tray Materials

XIV. Dental Porcelain

A. Composition

B. Classification

C. Properties

1. Denture Teeth
2. Porcelain Crowns, Veneers, Inlays

a) Fabrication Involving Hand Condensation

3. Porcelain-Metal Bonding

XV. Dental Implants

A. Natural Dentition Versus Implant Dentition

B. Titanium Types

1. Endosseous
2. Subperiosteal
3. Transosteal

C. Materials

1. Metals
2. Ceramics
3. Polymers and Composites
4. Coated Materials

D. Patient Selection

E. Professional Care

XVI. Miscellaneous Materials

A. Suture Removal

B. Rubber Dam

1. Rationale
2. Manipulation

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

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

Methods of Assessment:

1. Exams and lab projects

2. Lab projects.

Required text(s), optional text(s) and/or materials to be supplied by the student:

Powers and Wataha: Dental Materials Properties and Manipulation, 11th edition, 2017

Suggested Course Maximum:

28

List any specific or physical requirements beyond a typical classroom required to teach the course.

dental hygiene clinic, dental hygiene classroom and dental materials lab.

Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

Grading:

A = 93-100
B = 84-92
C = 83-75
D = 74-67
F = 66 and below

Minimum grade of 75 is required to pass the course

Evaluation:

Examinations	40%
Lab Projects	25%
Quizzes	10%
Final Exam	25%

Curriculum Checklist:

☐**Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.

☐**Administrative WCJC Core Course**. Attach the Core Curriculum Review Forms

- ☐Critical Thinking
- ☐Communication
- ☐Empirical & Quantitative Skills
- ☐Teamwork
- ☐Social Responsibility
- ☐Personal Responsibility

☒**WECM Course** -If needed, revise the Program SCANS Matrix and Competencies Checklist