COURSE OUTLINE

DHYG 240 – DENTAL MATERIALS THEORY

Prepared by: Pamela P. Quinn, RDH, BSE, MSEd
Mrs. Lindsay Argyle, RDH, BS
A. **TITLE:** DENTAL MATERIALS THEORY

B. **COURSE NUMBER:** DHYG 240

C. **CREDIT HOURS:** 2

D. **WRITING INTENSIVE COURSE:** NO

E. **COURSE LENGTH:** 15 WEEKS

F. **SEMESTER(S) OFFERED:** FALL

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**
   2 HOURS OF LECTURE EACH WEEK

H. **CATALOG DESCRIPTION:** This course provides a general overview of the chemical and physical properties and structure of materials in dentistry. A combination of lectures, powerpoints and web assigned activities will prepare the dental hygiene student to develop the skills outlined in the NYS Dental Hygiene Practice Act. Skills will be practiced in the lab setting on a typodont and/or a peer so all students must also be concurrently registered for a DHYG 241 Lab.

I. **PRE-REQUISITES/CO-COURSES:** Pre-requisite: matriculation in dental hygiene.
   Co-requisite: DHYG 241 Dental Materials Lab.

J. **GOALS (STUDENT LEARNING OUTCOMES):** By the end of this course, the student will:
   meet the following course learning outcomes which are linked to the institutional learning outcomes. This course provides the foundational knowledge for performing the following program competencies: 1.3, 1.8, 1.11, 1.12, 3.1, 3.7, 6.2, 6.5, 8.1, and 8.2.

<table>
<thead>
<tr>
<th>Course Learning Outcomes</th>
<th>Institutional Outcomes</th>
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<tbody>
<tr>
<td>1. List the preventive dental materials utilized by a dental hygienist practicing in New York State</td>
<td>3. Prof Competency</td>
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<td>2. Identify, describe and classify dental materials commonly utilized in general and specialty practices.</td>
<td>2. Critical Thinking</td>
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<td>3. Utilize evidence based decision making skills when selecting appropriate materials in the clinical setting.</td>
<td>3. Prof Competency</td>
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<tr>
<td>4. Identify dental materials when performing a clinical examination and interpreting radiographs.</td>
<td>2. Critical Thinking</td>
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<tr>
<td></td>
<td>3. Prof Competency</td>
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K. **TEXTS:**
   Gladwin, Marcia and Bagby, Michael, Clinical Aspects of Dental Materials, 4th Edition,
   Lippincott, Williams & Wilkins, Philadelphia, 2013.

L. **REFERENCES:**
   Clinical Research Associates (CRA) Newsletters on Reserve

   Journal articles and handouts will be assigned for specific topic areas.

M. **EQUIPMENT:** none

N. **GRADING METHOD:** A – F
A letter grade will be issued utilizing the following conversion table. All students must achieve a minimum C grade in all dental hygiene courses.

A  94 – 100
B+  90 - 93
B   84 - 89
C+  80 - 83
C   75 - 79
D   74 - 70
F   69 or lower

O. MEASUREMENT CRITERIA/METHODS:
Homework Assignments in ANGEL
Quizzes
Midterm
Final Exam

P. DETAILED COURSE OUTLINE:

I. Introduction/ Materials Science and Dentistry
   A. Biocompatible Materials
   B. Classification of Dental Materials
   C. Standards for Dental Materials
   D. Esthetics
   E. Temporary Materials
   F. Blacks’ Classification

II. Physical & Mechanical Properties
   A. Atomic Bonds in Solids
   B. Ionic Bonds
   C. Covalent Bonds
   D. Metallic Bonds
   E. Primary and Secondary Bonds

III. Adhesive Materials
   A. Micromechanical Bonding
   B. Macromechanical Bonding
   C. Acid Etching
   D. Dentinal Bonding

IV. Direct Polymeric Restorative Materials
   A. Polymers/Polymerization
   B. Addition Polymerization
   C. Improvements to Dental Resins
   D. Macrofilled, Microfilled and Hybrid Resins
   E. Sealants and Preventive Resins Restorations

V. Amalgam and Direct Gold
   A. Advantages of Using Amalgams
   B. Composition of Amalgams
   C. Factors Affecting Handling and Performance of Amalgams
   D. Amalgam Properties
   E. Gold Foils

VI. Dental Cements
   A. Luting Agent
B. Temporary Restorative Material
C. Pulp Protector/Cavity Sealer
D. Types of Dental Cements
E. Mixing Tips

VII. Impression Materials
   A. Classification of Impression Materials
   B. Elastic/Inelastic Materials
   C. Reversible and Irreversible Hydrocolloids
   D. Silicones
   E. Bite Registration Materials

VIII. Gypsum Materials
   A. Plaster
   B. Stone
   C. Die Stone
   D. Initial and Final Set Times
   E. Factors that increase or decrease set times
   F. Definitions: study model, case and die

IX. Materials for Fixed Indirect Restorations & Prostheses
   A. Lost Wax Technique
   B. Types of Alloys used to make Crowns
   C. Porcelain fused to Metal Crowns
   D. Zirconium Crowns

X. Removable Prostheses and Acrylic Resins
   A. Acrylic Resins
   B. Heat Cure and Cold Cure Resins
   C. Steps in the Construction of a Denture
   D. Steps for Relining a Denture

XI. Clinical Detection and Management of Dental Restorative Materials During Hygiene Apmt
   A. Use of Radiographs
   B. Use of Visual Appearance
   C. Surface Smoothness, Sound and Touch
   D. Frictional Heat
   E. Proper Use of Abrasives
   F. Power Instrumentation

XII. Polishing Materials and Abrasion
   A. Comparison of Finishing and Polishing
   B. Types of Abrasives
   C. Moh’s and Knoop’s Hardness Value

Q. LABORATORY OUTLINE: Not applicable – separate course