King Saud University

College of Dentistry

COURSE SYLLABUS

BASIC DENTAL BIOMATERIALS SCIENCE

RDS 131

1428-1429 (2007-2008)

Course Director : Dr. Alaa El-Araby [DUC]
I. Course Description

A dental material has always been a fascinating and challenging area for the dental practitioner. During the past several years dental materials science has undergone a virtual explosion of new knowledge. The advent of new polymeric and ceramic restorative systems, bonding and adhesive materials, implant materials, glass ionomer cements, precious and non-precious metal restorative systems and impression materials have virtually revolutionized the practice of modern dentistry. Therefore, dentist uses the largest number of materials from different classes. Materials are used in dentistry to prevent disease, restore parts of the teeth and associated structure, as well as replace and reconstruct whole teeth and associated hard/soft structures of the jaws and face in a functionally acceptable and esthetically pleasing manner.

This course is meant to teach the student of dentistry aspects of materials science necessary to enable him to understand and continue to learn dental biomaterials. Also, to develop an appropriate understanding of the criteria for the selection of materials for specific dental procedures.

II. Specific Educational Objectives:

1. Demonstrate the importance of studying basic dental materials as an essential component of the dental curriculum.

2. Expose the student to a knowledge base for an understanding of the basic physical, chemical and mechanical properties of all dental materials and relate these to clinical applications.

3. Understanding the crystal structure and the relationship between the physical mechanical properties and the changes in the crystalline structure.

4. Explain the significance of the phase diagram and how phase transformation can affect the physical/mechanical properties of different alloys.

5. Develop an appropriate understanding of how materials fail in the oral cavity.
III. Course Outline

1. Introduction – Materials in Dentistry and Crystal Structure I
2. Crystal Structure II
3. Physical Properties I
4. Physical Properties II
5. Surface Chemistry and Capillary Rise
6. Mechanical Properties I
7. Mechanical Properties II
8. Mechanical Properties III
9. Phase Diagram I
10. Phase Diagrams II
11. Strengthening of Metals
12. Introduction to Ceramics
13. Introduction to Polymers
14. Failure of Materials in the Oral Cavity
15. **Biocompatibility of Dental Materials**

**Methods of Presentation**

1. Lecture / Demonstration
2. Audiovisual aids

**Student Evaluation**

The students shall have two written continuous assessments, one written final exam. Each of the continuous assessments shall count for 25% of the grade and given at the completion of the 6th and 11th lectures. The final written exam shall count for 50% of the grade.

Written exams shall be objective, multiple choice, true or false, match sets, short essays and schematic drawings.

**Principal Reference**

Restorative Dental Materials.
Edited by Robert Craig, 11th edition.

**Additional References**

Al-Tahawi H.M. Basic Dental Biomaterials Science
2nd print, 1995, King Saud University Press.