

**Masters in Biomedical Science
Graduate School, RHBS**

Course Website:

Course Title: Chemical Properties and Structures of Dental Materials (DENT-5025Q-001)
Abbreviated Title: Chem Prop of Dent Materials

Semester Offered: Spring 2024

Hours: 30 (10-12 pm)

Course Director: Dr. Anil Ardeszna
C992, Dept of Orthodontics, RSDM
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Day of the Week: Friday

Room: MSB B619 and Zoom Virtual

Course Description: Introduction to dental biomaterials, and integration with the basic principles of engineering science and clinical dentistry. A wide variety of materials are used in dentistry. They have changed the way dentistry is practiced today and provided patients with more esthetic and biocompatible options. This course will teach the fundamental principles of material science and strength of materials. It will provide a scientific framework for the use of biomaterials in the clinical treatment of patients. The student will be exposed to the different types of materials such as metals, polymers, ceramics, composites, adhesives and how they are currently used in dentistry. Students will be made aware of the basic and clinical properties that make them suitable for use and future innovations. For each two hour weekly seminar, material will be covered based on either lectures by the instructor or assigned literature to be reviewed and discussed by the students. Evaluation shall be by four quizzes and an examination at the end of the course.

Course Format: For each 2hr hour weekly seminar, material will be covered based on either lectures by the instructor or assigned literature to be reviewed and discussed by the students. Evaluation shall be by four quizzes and an examination at the end of the course.

Course Goals: To provide a scientific framework for the use of biomaterials in the clinical treatment of patients. To expose the student to the different types of materials currently used in dentistry and make them aware of the basic and clinical properties that make them suitable for use. To increase awareness of the future directions of innovations that dental products may take.

Course Objectives: At the conclusion of the course the student should be able to:

- a. Understand the fundamental principles of material science
- b. Provide a rationale for the selection and use of specific materials in dentistry
- c. Describe the composition and properties of commonly used materials
- d. Distinguish between materials of the same type and discuss advantages and disadvantages of their use

- e. Critically evaluate dental manufactures' product claims

Reference Textbooks:

Introduction to Dental Materials. Richard Van Noort. 4th Edition 2013, ISBN: 978-0723436591
Mosby Ltd.

Fundamentals of Materials Science and Engineering: An Integrated Approach. William D.
Callister, David G. Rethwisch. 4th Edition: 2012. ISBN: 978-1118061602

<i>Date</i>	Room	Lecture	Title	
1/12/2024			Course Outline and Policy	
		1	Introduction to Dental Materials	
1/19/2024		2	Structure of Matter - Bonds	
1/26/2024		3	Structure of Matter – Atomic arrangement	Recorded
		4	Structure of Matter - Imperfections	Recorded
2/02/2024		5	Quiz 1 (lect 1,2,3,4)	
			Structure Composition - Solidification	
2/09/2024		6	Structure Composition - Phase Diagrams	Recorded
2/16/2024		7	Mechanical Properties	
2/23/2024		8	Physical Properties	
		9	Chemical Properties - Corrosion & Tarnish	
3/01/2024		10	Adhesion and Bonding	
3/08/2024		11	Quiz 2 (Lect 5,6,7,8,9)	
			Structure of Metals and Alloys	
3/15/2024		12	Dental Amalgam, Casting Alloys, Steel, NiTi	
3/22/2024		13	Quiz 3 (Lect 10,11,12)	
			Structure of Ceramics & Dental Ceramics	
3/29/2024		14	Structure of Polymers	
		15	Structure of Composites	
4/5/2024		16	Quiz 4 (Lect 13, 14, 15)	
			Review	
4/12/2024		17	Comprehensive Exam	

		Q1	Q2	Q3	Q4	Final	Total
		10/10	10/10	10/10	10/10	60/60	100/100
Actual Grades					Curved Grading Avg 85.0 SD +/- 7.0		
	A	90-100			A	91.5-100	
	B+	85-89			B+	88-91.5	
	B	80-84			B	81-88	
	C+	75-79			C+	77.5-81	
	C	70-74			C	74-77.5	
	F	-69			F	-74	