

Introduction to Biomaterials (3 Credit Hours) CRN 80473

A biomaterial is any substance (other than drugs) or combination of substances, synthetic or natural in origin which can be used for any period of time, as a whole or as a part of a system which treats, augment, or replace any tissue, organ, or function of the body. So, biomaterials intended to interface with biological systems to evaluate, treat, extend, or substitute any tissue, organ, or function of the body to solve the problems.

Introduction to the engineering of biomaterials. Examination of the structure, fundamental properties and functional behavior of materials such as metals, polymers, ceramics and composites used in medical devices and in biological systems, emphasizing mechanical, corrosion, and surface properties.

MEETING INFORMATION:

Days: Monday and Wednesday
Time: 10:30am to 12:45pm
Location: Holmes Hall 339

INSTRUCTOR INFORMATION:

Dr. Sarkis Sozkes

Email: ssozkes@fgcu.edu Phone: (239) 244-3939, Office location: Holmes Hall 314
Office Hours: M&W: 09:30am to 10:30am, OR by appointment.

COURSE MATERIALS:

***Biomaterials Science: An Introduction to Materials in Medicine
4th Edition***

by William R Wagner, Shelly E. Sakiyama-Elbert, Guigen Zhang ,
Michael J. Yaszemski

Publisher : ELSEVIER, Academic Press

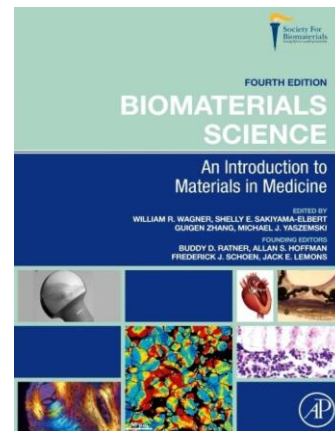
Publication date : June 30, 2020

Edition : 4th

Language : English

Print length : 1616 pages

ISBN-10 : 012816137X, ISBN-13 : 978-0128161371



Optional/Provided: Additional course materials will be posted by the instructor to the course Canvas site.

Additional Information: Most communications outside of class will be through email, and most assignments will be posted and submitted in CANVAS. You are expected to check the course Canvas page prior to class, and read your emails daily.

Prerequisites:

The following courses must be passed with a **minimum grade of C**:

EGM 3420C and CHM 1046C or CHM 1046 and CHM 1046L and STA 2023 or STA 2037

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COURSE LEARNING OUTCOMES

At the completion of the course, students will be able to:

1. Understand the broad field, absorb the unifying principles common to all biomaterials in contact with biological systems, and gain a solid appreciation for the special significance of the word biomaterial,
2. Hard and soft biomaterials, with coverage of all major material classes both synthetic and biologically derived,
3. The common application areas, including orthopedic, cardiovascular, ophthalmologic, dental, and emerging applications,
4. A balance of fundamental biological and materials science concepts, contemporary medical/clinical concerns, and regulatory/commercial/societal issues that reflect the complex environment in which biomaterials are developed and used,
5. Coverage of the past, present, and future of biomaterials, their applications, and key challenges that lie ahead.

GRADING & COURSE ACTIVITIES

Grading for this course is expected to include in-class activities and exercises, quizzes on CANVAS & during class, homework, an individual semester project; 2 midterm exams and final exam. The following weighting of grades will be used, at the instructors' discretion this scale may be expanded (grade thresholds lowered) but will not be tightened.

Grading Scale:

≥ 95.0 A		≥ 90.0 A-	
≥ 86.6 B+	≥ 83.3 B	≥ 80.0 B-	
≥ 75.5 C+		≥ 70.0 C*	
≥ 60.0 D			
≥ 50.0 F			

***C or better is required to advance**

Assignment Weights:

Quizzes	15%
2 Midterms (15% each)	30%
In-Class Activities	10%
Biomaterials Term Project	20%
Final Exam	25%

Late Submissions: Most work will be submitted online through Canvas. Late submissions of either paper or electronic format may not be accepted, or may result in a penalty. Your written work may be electronically tested for plagiarized content.

Do not duplicate another person's work or allow another student to duplicate your work, this will result in a failing grade for the course and other disciplinary actions may be taken.

Attendance: Attendance and active participation in the course are expected. Classes will often include graded in-class activities and exercises (e.g. short quizzes, individual or team problems, etc.) and discussion (e.g. on homework assignments, in-class exercises, project progress, etc.). Students missing class, tests, or assignments due to emergencies or illness must submit appropriate documentation to the instructor. If a student has 4 or more absences they may receive a grade penalty not exceeding 1% for each absence. If a student is tardy or off-task, it will be considered 0.5 absences.

Quizzes: Quizzes are designed to be a reminder and encouragement to read the assigned materials prior to each class, as class discussion will be livelier and more meaningful when you

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are prepared. Quizzes will be based on the reading assignments from the textbook or any handouts assigned as readings and are meant to highlight the important concepts/topics in each chapter. Quizzes will typically be due before class. No makeup quizzes will be given. If a quiz is missed due to a valid medical or family emergency, the overall quiz grade will be based on average of your other quizzes.

Midterm & Final Exam: Exams will focus assessment of learning from assigned readings, homework, and class discussions/exercises. Since the expected learning outcomes are to synthesize, evaluate, and apply the components and tools of product design, exams will typically include variety of question types, from multiple choice to long-format essay responses. Unless stated otherwise, exams will be closed book and closed notes. The only materials allowed on the desktop during an exam are writing instruments, straight-edges (ruler, etc.), calculators and any materials provided by the instructor. All other materials (cell phones, etc.) must be placed under the desk during the exam. Once an exam begins, students may not leave the room (i.e. restroom breaks, etc.) without approval of the instructor, until they have completed and submitted the exam.

Biomaterials Term Project: Students will select a engineered biomaterial & topic area. Once selected, this is will become the main focus of the term project for the first half of the course. All topics covered in class will be related by students back to their biomaterial , and students will become intimately aware of the process and utilization of the biomaterial. Students will partner on a biomaterial as they investigate the details and jointly prepare the project portfolio. Students will benefit from classroom discussions about the various biomaterials. The project includes a product ‘portfolio’ detailing the manufacturing process associated with the biomaterial and a final poster presentation will be prepared. The presentation challenge is intended as a fun and creative activity for learning and applying the biomaterials knowledge and as a friendly competition between student teams.

Please see the up-to-date list of university guidance and resources for course syllabi:
<https://www.fgcu.edu/about/leadership/officeoftheprovoost/core-syllabus-policy-statements>