

University of Central Florida
Department of Mechanical, Materials and Aerospace Engineering

EMA 5584
Biomaterials (Intermediate Level)

Course Content: Basic introduction to biomaterials, Properties of materials, Cell-biomaterial interactions- tissue response, Type of biomaterials: Metallic, Ceramic, Polymeric and Composites, their properties and applications; Basics of Biology: Proteins, Cells, Tissues, Organs; Orthopedic and Dental implants, Artificial organs, Current Challenges.

Goals: Objective of this course is to provide basic understanding on biomaterials and help students develop interest in interdisciplinary research to produce skilled professionals to meet the existing and emerging challenges in biomedical industry.

Prerequisite: EGN 3365 Structure and Properties of Materials or equivalent

Instructor: Dr. Samar Jyoti Kalita, Room Number 245, 407-823-3159,
samar@mail.ucf.edu

Time: Monday and Wednesday, 9:00-10:20; ENGR 227

Text: 1. Biomaterials: Principles and Applications, by Joon Bu Park (Editor),
Joseph D. Bronzino (Editor) ISBN:0849314917

References: 1. Biomaterials Science: An introduction to Materials in Medicine,
edited by B.D. Rutner, A.S. Hoffman, F. J. Schoen and J.E.
Lemenons, Academic Press (ISBN: 0-12-582460-2).
2. Structural Biomaterials by J. Vincent, Princeton University Press
(ISBN: 0-691-08558-7)
3. An introduction to Bioceramics: edited by L.L.Hench and J. Wilson,
World Scientific (ISBN:981-02-1400-6). Publisher: CRC Press;
2nd edition (December 28, 1999), ISBN: 0849385946
4. The Biomedical Engineering Handbook, Second Edition, Two
Volume Set by Joseph D. Bronzino (Editor)

Topics:

1. Basic of Biomaterials
2. Properties of materials
3. Background on Biology: proteins, cells, tissues, and organs
4. Cell-Biomaterial interactions
5. Metallic Biomaterials
6. Ceramic Biomaterials
7. Polymeric and Composite Biomaterials
8. Applications of Biomaterials in Medicine, Artificial Organs, Orthopedics, and Dentistry
9. Current Challenges

Grading:

Exam I	25%
Exam II	25%
Exam III	30% (Cumulative)
Special Project	10%
Assignments	10%

Project topics will be announced during the second week of the semester. You are welcome to select your own topic in the field of biomaterials engineering and get it approved by the instructor.

General Policies:

- There will be no make-up exam given. In case of emergency/ illness, special arrangement will be made on one-to-one basis.
- Feedback and suggestions to improve the quality of the course are always welcome.
- Class participation is strongly encouraged.
- Plus/minus grading system will be followed. The grade is based on your performance with respect to the class.