

# Technical-Elective

## Biomaterials II: Tissue Engineering

### Spring 2021

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#### CATALOGUE DESCRIPTION

Essential role of all artificial biomaterial implants, three generations of biomaterials, principle of tissue engineering, alternative solution, eleven organ systems, the most threatening human diseases in these systems, tissue engineering protocols using biomaterials, technical standards and legal regulations on biomaterials and tissue engineering, four phases of clinical trials.

<b>Mode of Delivery</b>	On campus
<b>Workload</b>	3 hours of lectures/tutorials and 8 hours of private study per week.
<b>Prerequisites</b>	ENGR 0022
<b>Campus:</b>	Zone 3-106
<b>Instructor:</b>	Grace Chen
<b>Email:</b>	<a href="mailto:grace.chen@scu.edu.cn">grace.chen@scu.edu.cn</a>
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#### ACADEMIC OVERVIEW

##### Learning Objectives

Upon successful completion of this course, the students will be able to:

1. Understand the principle of tissue engineering
2. Understand some techniques used in tissue engineering including methods of scaffold manufacture.
3. Appreciate basic medical concepts and be able to communicate effectively with the medical community
4. Have a basic understanding of the human anatomy, and be aware of the most threatening human diseases of global population
5. Appreciate the approach of tissue engineering as an alternative solution
6. Understand regulations and ethical responsibilities in the process of developing biomaterials, medical devices, and tissue engineering protocols
7. Be able to review a journal article and provide a detailed assessment.

##### Grading Policy

Assessment Task	Value
1. Attendance and Answer questions in class	10 %

2. Homework	20 %
3. Mid-semester examination	30 %
4. Group Presentations	30 %
5. Final Exam: Technical Presentation/Essay	10 %

The Instructor reserves the right to moderate the assessment policy. This process will occur at the end of the semester.

### Teaching and Learning Method

The unit consists of lectures and problem classes. Learning in the unit is mainly through attending the lectures, problem classes and completing the assignments and group presentations.

## RECOMMENDED TEXTBOOKS AND READINGS

### On Biomaterials:

1. Biomaterials: A Basic Introduction. By Qizhi Chen and George Thouas.
2. Biomaterials Science: An Introduction to Materials in Medicine. Ed: Buddy D Ratner, Allan S Hoffman, Frederick J. Schoen, Jack E. Lemons. 2<sup>nd</sup> ed. Elsevier Academic Press, c2004.

### On Tissue Engineering:

3. Principles of Tissue Engineering, R.P. Lanza, R. Langer, and J.P. Vacanti, Editors. 2000, Academic Press: California.

### On Anatomy and Histology

4. **Excellent websites:**  
<http://www.innerbody.com/htm/body.html> (Excellent illustrations)  
<http://www.free-ed.net/free-ed/HealthCare/Anatomy/default.asp> (concise)

### On Evaluation and Regulation

5. Hand Book of Biomaterials Evaluation. AF von Recum (editor). 2nd ed. Scientific, technical, and clinical testing of implant materials. c1999.
6. <http://www.fda.gov/> U.S Food and Drug Administration:  
<http://www.iso.org/iso/home.htm> International Organization for Standardization (ISO)

Prepared by: Grace Qizhi Chen Date: 01 March 2021