

## Syllabus

### Tissue Engineering BIEN 136/ MSE 136 Spring 2017

**Course Time:** TR 11:10pm-12:30pm

**Location:** INTN 1002

**Instructor:** Dr. Huinan Liu

Associate Professor of Bioengineering, Materials Science and Engineering, and Stem Cell Center

Email: [huinanliu@engr.ucr.edu](mailto:huinanliu@engr.ucr.edu) (Preferred Communication)

Instructor Office Hours: TBA in class

TA: Wayne Leu

Office Hours: TBD (Announcement in ilearn)

### Prerequisites

BIOL 005 A and B, CHEM 001C, Biomaterials (BIEN 140A) or equivalents; junior/senior standing

### Course Description

Covers progress in cellular and molecular biology, and engineering, to provide the basis for advancing tissue repair and regeneration with the goal of restoring compromised tissue functions. Presents methods for cell culture, tissue design and development, manipulation of the cell/tissue microenvironment, and current strategies for functional reconstruction of injured tissues.

### Learning Objectives

The course has three core objectives: (1) Students learn the structure, physiochemical, mechanical, biological properties of a variety of tissues, including bone, cartilage, ligament, blood vessel, nerve, skin, bladder, etc. (2) Students learn basic tissue engineering principles and techniques. (3) Students learn the ability to apply tissue engineering design to create tissue friendly microenvironment to allow healing and regeneration, eventually restoring the compromised tissue functions.

At the end of this course, students will be able to accomplish the following.

1. Identify unique properties of soft tissues and hard tissues
2. Determine critical design criteria of tissue engineering
3. Design microenvironment for controlling cellular/tissue functions using tissue engineering principles and techniques
4. Search and review literatures on tissue engineering

### Methodology

A variety of activities, including, lectures, discussion, debate, literature review, case study, team project and student presentations, will be used to facilitate students' learning.

### Course Text

**Textbook:** None Required. Course handouts will be available on ilearn.

### Suggested Reference Books (Available at Science Library)

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1. Tissue Engineering By John P. Fisher, Antonios G. Mikos, Joseph D. Bronzino. 2007 CRC Press. ISBN-10: 0849390265, ISBN-13: 978-0849390265
2. Principles of Tissue Engineering. Edited by: Robert Lanza, Robert Langer and Joseph Vacanti 2007 Elsevier. ISBN: 978-0-12-370615-7
3. Tissue Engineering, by Bernhard O. Palsson and Sangeeta N. Bhatia. Publisher: Prentice Hall; 1 edition (August 9, 2003). ISBN-10: 0130416967, ISBN-13: 978-0130416964

## Evaluation and Grading

### Evaluation of Student Performance

|                                               |      |
|-----------------------------------------------|------|
| Homework, Quizzes, and Participation in Class | 20%  |
| Literature Review and Presentation            | 20%  |
| Individual Case Study Report                  | 20%  |
| Case Study Presentation and Debate            | 20%  |
| Team Project and Presentation                 | 20%  |
| Total                                         | 100% |

## Grading Scale

|                    |                   |                    |
|--------------------|-------------------|--------------------|
| A+ ≥ 95.00         | 95.00 > A ≥ 90.00 | 90.00 > A- ≥ 88.00 |
| 88.00 > B+ ≥ 82.00 | 82.00 > B ≥ 80.00 | 80.00 > B- ≥ 78.00 |
| 78.00 > C+ ≥ 75.00 | 75.00 > C ≥ 72.00 | 72.00 > C- ≥ 70.00 |
| 70.00 > D+ ≥ 65.00 | 65.00 > D ≥ 62.00 | 62.00 > D- ≥ 60.00 |
|                    | 60.00 > F         |                    |

## Course Policies

**Students absent for the first 2 weeks of lectures without valid excuses: No credit for course.**

**All students are required to be on time for the class.** Students who are late for 10min or more will not be allowed into the class and receive 0 credit.

**Late submission of assignments will receive zero credit.**

**Make-up events (e.g. classes, quizzes, discussions, exams, etc.) must be requested in written format (email both instructor and cc TA is acceptable) 24 hours prior to the event with valid proof of excuses (e.g. physician signature for sickness, etc.).** With valid proof of excuses, make-up papers can be submitted for credit for each absence incurred. Make-up papers are <1000-word essays on the topic missed and must be submitted electronically via [www.iLearn.ucr.edu](http://www.iLearn.ucr.edu) in the *Safe Assignments* directory of the course before **5pm Pacific Time, June 1, 2017.**

Discussion of homework problems with other students in the class is acceptable but direct copying of complete or part of an assignment is not allowed. Cheating on exams and/or plagiarism in projects will result in an F grade given for the course.

**Plagiarism: Both parties receive a zero credit.**

## Team Project Topics:

Each team can pick one of these projects below:

1. Bone tissue engineering
2. Spinal cord injury and tissue engineering approaches
3. Craniofacial trauma and tissue engineering treatment
4. Cartilage tissue engineering
5. Vascular tissue engineering
6. Muscle Tissue Engineering
7. Neural Tissue Engineering
8. Bladder Tissue Engineering
9. Retina Tissue Engineering

You can also choose a topic your team is most interested in and discuss with the instructor and TA.