

**BE 4335: Tissue Engineering  
Spring 2012 Syllabus**

**Meeting Schedule:** Monday-Wednesday-Friday 8:40-9:30, 115 E.B. Doran Building

**Text Book:** **Tissue Engineering**  
Clemens Van Blitterswick Academic Press 1<sup>st</sup> Edition 2008

**Instructor:** Daniel Hayes, E-mail: danielhayes@lsu.edu  
Office Hours: TH 3:30-4:30 or by appointment

**Teaching Assistant:** None

**Final Exam Date:** TBD

**Course Description:**

This course is designed to familiarize current and future researchers with tissue engineering concepts and current practice. Topics covered include: embryology, stem cell biology, cell signaling, nutrition, cryobiology, biomaterials synthesis/characterization, biocompatibility and scaffold design.

**COURSE LEARNING OBJECTIVES:**

1. Understand the paradigms of tissue engineering and regenerative medicine
2. Develop a more complete understanding of cell biology, development and tissue repair.
3. Improve knowledge of the mechanical and chemical properties of biomaterials.
4. Improve critical thinking and presentation skills.

**Course Policies**

- You will work on the **tissue engineering design projects** in groups. Each group will have the opportunity to present their work in front of the class at the end of the semester.
- **Examinations** missed due to an unexcused absence cannot be made up and a grade zero will be given for each one missed.
- Any student requiring **special arrangements** for taking exams, taking-notes and other special arrangements please see or contact the instructor within the first two weeks of class.

**Academic Integrity**

Students are expected to comply with the Code of Student Conduct throughout this course. For your information, the Code of Student Conduct can be found at [http://appl003.lsu.edu/slas/dos.nsf/\\$Content/Code+of+Conduct?OpenDocument](http://appl003.lsu.edu/slas/dos.nsf/$Content/Code+of+Conduct?OpenDocument)

**Grading policy:** Grades will be determined based on the following break down:

Exams (2) 30% each, Tissue Engineering Design Report and Presentation 25%, Paper Critique (1) 15%.

**Grade Assignments:** A (> 90), B (80-89.9), C (70-79.9), D (60-69.9), F (<60)

## LECTURE SCHEDULE

Date	Topic	Readings	
January	18	Introduction to the course	
	20	Science vs. Engineering	From Moodle
	23	Intro to Tissue Engineering	Introduction
	25	Intro to Stem Cells	Chapter 1
	27	<i>Literature Critique-Discussion</i>	From Moodle
February	30	Tissue Dynamics	Chapter 2
	1	Morphogenesis	Chapter 3
	3	<i>Literature Critique-Discussion</i>	From Moodle
	6	Cell Signaling	Chapter 4
	8	Tissue Organization	
	10	<i>Literature Critique-Discussion</i>	From Moodle
	13	Intro to Scaffolds and Materials	Chapter 5
	15	Natural Polymer Systems	Chapter 6
	17	<i>Literature Critique-Discussion</i>	From Moodle
	20	<i>Mardi Gras</i>	
	22	<i>Mardi Gras</i>	
	24	Biocompatible Synthetics	Chapter 7
	27	Bioceramics	Chapter 8
	29	Biocompatibility	Chapter 9
March	2	<i>Literature Critique-Discussion</i>	From Moodle
	5	Cell Nutrition	Chapter 12
	7	Tissue Engineering Methods	Chapter 11
	9	<i>Literature Critique-Discussion</i>	From Moodle
	12	Cell Sourcing	Chapter 10
	14	<i>Dr. Gimble-Adult Stem Cells</i>	Chapter 8
	16	<i>Mid-term Exam</i>	
	19	Cell Harvest	Chapter 11
	21	Scaffold Design	Chapter 14
	23	<i>Dr. Devireddy-Physics of Cryopreservation</i>	Chapter 13
	26	Tailoring Biomaterials	Chapter 15
	28	Bioreactors Design	Chapter 16
	30	<i>Literature Critique-Discussion</i>	From Moodle
	April	2	Tissue Engineering Bone
4		Tissue Engineering Skin	Chapter 19
6		<i>Spring Break</i>	
9		<i>Spring Break</i>	
11		<i>Spring Break</i>	
13		<i>Spring Break</i>	
16		Host Integration and Cell Fate	Chapter 20
18		Tissue Engineering Nervous Sys.	Chapter 21
20		<i>Literature Critique-Discussion</i>	From Moodle
23		Design Project Presentations	
25		Design Project Presentations	
27	Design Project Presentations		
30	Design Project Presentations		
May	2	Ethical Issues in Tissue Engineering	
	4	<i>Literature Critique-Discussion</i>	From Moodle

**Exams:** There are two exams, a midterm and a final each worth 30% of the total course grade. The exams will have both qualitative and quantitative portions testing theory and practical knowledge.

**Design Project:** This project will require students to propose a product, design the product and assess the potential viability of the product in the current market. Considerations include, market need, technical feasibility, production process design and constraints, regulatory landscape, cost structure and market penetration. Students will work in groups of two. The project is worth 25% of the final grade.

**Literature Critique:** Students will be required to prepare a literature critique on an article drawn from the relevant peer-reviewed journals. A one page written critique will be included along with a fifteen minute presentation (on Fridays) with class discussion. The critique is worth 15% of the final grade.