BIOEN 6140: Fundamentals of Tissue Engineering (2 credit hours)
Spring semester, 2005.

Course Instructor:
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Office Hours: Thursday, 9:00am-11:00am.

Class Hours and Location:
Wednesday, 3:05pm – 5:00pm, MEB 2325.

Reading Assignments:
- Other required reading assignments (e.g., journal articles) will be distributed in class.

Grading:
1. Graduate students
- Exam I: 30%; in class, open book/notes; on March 02, 2005.
- Exam II: 30%; in class, open book/notes; on April 27, 2005.
- In-class oral presentation (25 to 30 min): 40%.
  Each student will present one paper and one patent related to any of the topics listed for the weeks of March 09 – April 20, 2005. Students should inform the course instructor of his/her chosen topic by February 02, 2005.

2. Undergraduate students
- Exam I: 30%; in class, open book/notes; on March 02, 2005.
- Exam II: 30%; in class, open book/notes; on April 27, 2005.
- Term paper: 40%, due in class on April 27, 2005.
  Each student will write a review on patents related to any of the topics listed for the weeks of March 09 – April 20, 2005. Use the review article format for “Tissue Engineering” to prepare your term paper (i.e., margins, line spacing, reference format, figure legends, etc.). See the journal’s website for detailed instructions for “Manuscript Submission”. Limit the main text to 3000 words. Students should inform the course instructor of his/her topic by March 09, 2005.

3. Special notes
- Graduate and undergraduate students will be evaluated separately.
- The instructor will do all the grading.
- The instructor will use numerical grades (in a 100 scale) when grading exams, term papers, and oral presentations. Unless otherwise specified in class, numerical grades will be converted into letter grades in the following manner: A’s: 90-100; B’s: 80-89; C’s: 70-79; D’s: 60-69; E: 0-59.
- Evaluation of your oral presentations/term papers emphasizes the following positive aspects of your coursework/tests: correctness, thoroughness, organization, and innovation. Additionally, your coursework should be expressed in your own words and the source of any of your citations/quotations should be acknowledged.
Others:
- Any suggestion to a change in the in-class exam dates listed above MUST be made sufficiently early. ALL students in class have to agree to a proposed change before it can be accepted.
- Any student who misses the in-class exam or due dates of term papers can reschedule the exam or due date ONLY in cases of documented emergencies or sickness.
- Late term papers will be not be graded.
- Any student with a documented disability needing academic adjustments or accommodations is requested to speak with the instructor immediately and also contact Center for Disability Service (162 Union Building).

Lecture Outline:
Date/Topic/Reading Assignment (in PTE)

Wk 1. 01/12/05
1. Course outline.
2. Search patents and trademarks.

Wk 2. 01/19/05
1. Introduction to tissue engineering. (PTE: Ch 1-2)
2. Cell sources and stem cells. (PTE: Ch 29, 44)
3. Cell isolation and selection; Tissue preservation. (PTE: Ch 24)

Wk 3. 01/26/05
1. Structure and organization of tissues; Extracellular matrices; Cell-matrix interactions. (PTE: Ch 3-5)
2. Regulatory issues and standardization. (PTE: Ch 65)
3. Intellectual property.

Wk 4. 02/02/05
☞ Decide oral presentation topics (graduate students only).
1. Cell-synthetic surface interactions and the ensuing effects on cell growth, cell adhesion, cell migration, and cell-cell communication. (PTE: Ch 11, 19-20)
2. Hormones signaling; Delivery of hormones (drugs). (PTE: Ch 12)

Wk 5. 02/09/05
1. Scaffolds and tissue engineering. (PTE: Ch 18, 21-22)

Wk 6. 02/16/05
1. Transplantation of engineered cells and tissues. (PTE: Ch 23)
2. Immunomodulation and immunoisolation. (PTE: Ch 25-26)

Wk 7. 02/23/05
1. Mechanical properties of biological tissues. (PTE: Ch 9, 17)
2. Transport properties of biological tissues. (PTE: Ch 17, 27)
3. The design of biomimetic environments; Bioreactors. (PTE: Ch 13)

Wk 8. 03/02/05
☞ In class exam (undergraduate and graduate students).
Wk 9. 03/09/05

Decide term paper topics (undergraduate students only).
1. Artificial skin. (PTE: Ch 61-63)
2. Student presentation (1).

Wk 10. 03/16/05  No Class - Spring Break.

Wk 11. 03/23/05
1. Artificial blood vessels, vascular grafts, and cardiac prostheses. (PTE: Ch 32-34)
2. Student presentation (2).

Wk 12. 03/30/05
1. Bone repair. (PTE: Ch 47-48)
2. Student presentation (3).

Wk 13. 04/06/05
1. Repair of cartilage, tendon, and ligaments. (PTE: Ch 49-50)
2. Student presentation (4).

Wk 14. 04/13/05
1. Artificial liver (PTE: Ch 41); Treatment of endocrine disorders. (PTE: Ch 36-37)
2. Student presentation (5).

Wk 15. 04/20/05
1. Nerve regeneration. (PTE: Ch 55-57)
2. Student presentation (6).

Wk 16. 04/27/05

In class exam (undergraduate and graduate students).

Term papers due (undergraduate students only).
Appeals Procedures

See the Code of Student Rights and Responsibilities, located in the Class Schedule or on the U of U Web site for more details.

Appeals of Grades and other Academic Actions
If a student believes that an academic action is arbitrary or capricious he/she should discuss the action with the involved faculty member and attempt to resolve. If unable to resolve, the student may appeal the action in accordance with the following procedure:
1. Appeal to Department Chair (in writing) within 40 working days; chair must notify student of a decision within 15 days. If faculty member or student disagrees with decision, then,
2. Appeal to Academic Appeals Committee (see flyers posted in MEB and EMCB for members of committee). See II Section D, Code of Student Rights and Responsibilities for details on Academic Appeals Committee hearings.

Withdrawal Procedures

See the Class Schedule or web for more details **Please note the difference between the terms “drop” and “withdraw”. Drop implies that the student will not be held financially responsible and a “W” will not be listed on the transcript. Withdraw means that a “W” will appear on the student’s transcript and tuition will be charged. **

Drop Period - No Penalty
Students may DROP any class without penalty or permission during the FIRST TEN calendar days of the term (Wednesday, January 18).

Withdrawal from Full Term Length Classes
Students may WITHDRAW from classes without professor’s permission until Friday, March 4. Please note that a “W” will appear on the transcript and tuition will be charged. Refer to Class Schedule, Tuition and Fees for tuition information.

Withdrawal from Session II
See the web page for details: http://www.sa.utah.edu/regist/calendar/datesDeadlines/spring2005.htm

Withdrawals after March 4 can only be granted due to compelling, nonacademic emergencies. A petition and supporting documentation must be submitted to the Dean’s Office, 214 Kennecott Building or University College (450 SSB) if you are a pre-major. Petitions must be received before the last day of classes (before finals week.).

Adding Classes

THE UNIVERSITY HAS IMPLEMENTED A NEW POLICY REGARDING ADDING CLASSES. Please read carefully: All classes must be added within two weeks of the beginning of the semester (deadline: January 24, 2005). Late adds will be allowed Jan. 25-30, requiring only the instructor’s signature. Any request to add a class after Jan. 30 will require signatures from the instructor, department, and dean, and need to be accompanied by a petition letter to the Dean’s office.

***A $50 FEE WILL BE ASSESSED BY THE REGISTRAR’S OFFICE FOR ADDING CLASSES AFTER Jan. 30. ***