California State University Channel Islands

NEW COURSE PROPOSAL

Courses must be submitted by November 2, 2009, for priority catalog review.

DATE (Change if modified and redate file with current date) 9/30/09; REV 12.8.09
PROGRAM AREA(S) BIOLOGY

1. Course Information. [Follow accepted catalog format.]
Prefix(es) (Add additional prefixes if cross-listed) and Course No. BME 501
Title: FUNDAMENTALS OF TISSUE ENGINEERING AND BIOMATERIALS Units: 3
Prerequisites BIOL 504; PHYS 200 and 201 or BIOL/PHYS 315
Corequisites
Consent of Instructor Required for Enrollment
Catalog Description (Do not use any symbols): Covers molecular, cellular, tissue and organ engineering and societal and ethical issues in regenerative medicine. Also considers major types of biomaterials including metallic, ceramic, polymeric, biodegradable, composite, nano- and other replacement materials and techniques and procedures used in biomedical engineering.

Grading Scheme: Repeatability: Course Level Information:

| A-F Grades | Repeatable for a maximum of units | Undergraduate |
| Credit/No Credit | Total Completions Allowed | Post-Baccalaureate/Credential |
| Optional (Student Choice) | Multiple Enrollment in Same Semester | Graduate |

Mode of Instruction/Components (Hours per Unit are defaulted).

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<tr>
<th>Units</th>
<th>Hours per Unit</th>
<th>Benchmark Enrollment</th>
<th>Graded Component</th>
<th>CS &amp; HEGIS #</th>
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<tbody>
<tr>
<td>Lecture</td>
<td>2</td>
<td>1</td>
<td>20</td>
<td>x</td>
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<tr>
<td>Seminar</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Laboratory</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Activity</td>
<td>1</td>
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<td>Field Studies</td>
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<td>Indep Study</td>
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<td>Other Blank</td>
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Leave the following hours per week areas blank. The hours per week will be filled out for you.
2 hours lecture per week
3 hours laboratory per week

2. Course Attributes:

General Education Categories: All courses with GE category notations (including deletions) must be submitted to the GE website: http://summit.csuci.edu/geapproval. Upon completion, the GE Committee will forward your documents to the Curriculum Committee for further processing.

A (English Language, Communication, Critical Thinking)
- A-1 Oral Communication
- A-2 English Writing
- A-3 Critical Thinking

B (Mathematics, Sciences & Technology)
- B-1 Physical Sciences
- B-2 Life Sciences – Biology
- B-3 Mathematics – Mathematics and Applications
- B-4 Computers and Information Technology

C (Fine Arts, Literature, Languages & Cultures)
- C-1 Art
- C-2 Literature Courses
- C-3a Language
3. **Justification and Requirements for the Course.** (Make a brief statement to justify the need for the course)

A. Justification: This is a required course for the MS Biotechnology with an Emphasis in Biomedical Engineering program.

B. Degree Requirement: x Requirement for the Major/Minor

Note: Submit Program Modification if this course changes your program.

4. **Learning Objectives.** (List in numerical order. You may wish to use the following resource in utilizing measurable verbs: http://senate.csuci.edu/comm/curriculum/resources.htm)

Upon completion of the course, the student will be able to:
- Describe tissue engineering principles and applications at molecular, cellular, tissue and organ levels
- Identify the materials used in tissue engineering and other applications
- Summarize the reasons for biocompatibility
- Describe and compare the differences of various processes of scaffold design and fabrication in tissue engineering
- Identify and apply ethical and regulatory standards in tissue engineering and regenerative medicine

5. **Course Content in Outline Form.** [Be as brief as possible, but use as much space as necessary]

- History of tissue engineering and regenerative medicine
- Morphogenesis, generation of tissue in the embryo
- Engineering at the genetic, molecular, cellular, tissue and organ levels
- Tissue and organ engineering applications and regenerative medicine
- Materials used for tissue engineering
- The extracellular matrix as a biologic scaffold for tissue engineering
- Natural and degradable polymers in tissue engineering applications
- Scaffold design and fabrication
- Metallic, ceramic, polymer implant materials and tissue response
- Biomaterial processing, immunology and biocompatibility
- Biomaterial applications
- Cell source, stem cells, cell culture and cryobiology
- Soft and hard tissue replacement and transplants
- Ethical and societal issues in tissue engineering and regenerative medicine
- Regulation of tissue engineering

Does this course content overlap with a course offered in your academic program? Yes ☑ No ☑

If YES, what course(s) and provide a justification of the overlap.

Does this course content overlap a course offered in another academic area? Yes ☑ No ☑

If YES, what course(s) and provide a justification of the overlap.

Overlapping courses require Chairs’ signatures.

6. **Cross-listed Courses** *(Please note each prefix in item No. 1)*

A. List Cross-listed Courses (Signature of Academic Chair(s) of the other academic area(s) is required).

List each cross-listed prefix for the course:
B. Program responsible for staffing: Biology

7. References. [Provide 3 - 5 references]


8. Tenure Track Faculty Qualified to Teach This Course.

Biology faculty

9. Requested Effective Date:
First semester offered: S2011

10. New Resources Requested. Yes No x
If YES, list the resources needed.

A. Computer Needs (data processing, audio visual, broadcasting, other equipment, etc.)

B. Library Needs (streaming media, video hosting, databases, exhibit space, etc.)

C. Facility/Space/Transportation Needs

D. Lab Fee Requested (please refer to Dean’s Office for additional processing) Yes No x

E. Other

11. Will this new course alter any degree, credential, certificate, or minor in your program? Yes x No
If YES attach a program update or program modification form for all programs affected.
Priority deadline for New Minors and Programs: October 5, 2009 of preceding year.
Priority deadline for Course Proposals and Modifications: November 2, 2009, of preceding year.
Last day to submit forms to be considered during the current academic year: April 15th.

Ching-Hua Wang 10-1-09

Proposer of Course (Type in name. Signatures will be collected after Curriculum approval) Date
Approval Sheet

Program/Course:  
If your course has a General Education Component or involves Center affiliation, the Center will also sign off during the approval process.

Multiple Chair fields are available for cross-listed courses.

Program Chair  
Signature  Date

Program Chair  
Signature  Date

Program Chair  
Signature  Date

General Education Chair  
Signature  Date

Center for International Affairs Director  
Signature  Date

Center for Integrative Studies Director  
Signature  Date

Center for Multicultural Engagement Director  
Signature  Date

Center for Civic Engagement Director  
Signature  Date

Curriculum Chair  
Signature  Date

Dean of Faculty  
Signature  Date