CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS
NEW COURSE PROPOSAL

DATE 11.27.06
PROGRAM AREA BIOLOGY

1. Catalog Description of the Course. [Follow accepted catalog format.]

Prefix BIOL Course# 405  Title : BIOCHEMICAL ENGINEERING  Units (4)
3 hours lecture per week
3 hours laboratory per week
Prerequisites CHEM318
Corequisites

Description Emphasizes quantitative engineering aspects of biology including the microbial synthesis of commercial products, environmental biotechnology, and the manufacture of biopharmaceuticals through recombinant microorganisms, transgenic animals, and plants. Consideration will be given to protein isolation and purification, microbial kinetics and energetics, enzyme kinetics, and operation of bioreactors. A lab fee is required.

Graded
Categories
Lab Fee Required
A - F Total Completions Allowed
Optional (Student’s choice)
Multiple Enrollment in same semester
Title V Section 40404: Government US Constitution

2. Mode of Instruction.

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<tr>
<th>Component</th>
<th>Units</th>
<th>Hours per Unit</th>
<th>Benchmark Enrollment</th>
<th>Graded Component</th>
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<tr>
<td>Lecture</td>
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<td>Activity</td>
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3. Justification and Learning Objectives for the Course. (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements) [Use as much space as necessary]

Biochemical Engineering concerns the engineering of discovery processes and the translation of discoveries in Biochemistry and Medicine into commercial processes for new biological entities such as medicines and therapeutics. It encompasses the biology, engineering, mathematics and business behind this translation.

Learning Outcomes:
Upon completion of the course, the student should be able to:

1. Model and analyze simple bioreactor systems, including chemostats and enzyme batch reactors, using first principles models.
2. Analyze metabolic pathway models for application to chemostat reaction systems.
3. Design procedures for expression of foreign genes in E. coli using principles of cellular chemistry.
4. Develop a historical exposition of biotechnology.
5. Analyze batch bioreactor data.
6. Evaluate separations systems for cell separation and purification of intracellular and secreted compounds from bacterial and animal cell cultures.

4. Is this a General Education Course   YES ☑   NO ☒
If Yes, indicate GE category and attach GE Criteria Form:

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

1. Theory and Design of Bioreactors
2. Enzyme catalysis
3. Transport processes
4. Microbial Growth and Interactions
5. Bioseparations, drying, and instrumentation
6. Bioproducts and Economics

Does this course overlap a course offered in your academic program? YES  NO
If YES, what course(s) and provide a justification of the overlap?

Does this course overlap a course offered in another academic area? YES  NO
If YES, what course(s) and provide a justification of the overlap?
Signature of Academic Chair(s) of the other academic area(s) is required on the signature sheet below.

6. Cross-listed Courses (Please fill out separate form for each PREFIX)
List Cross-listed Courses

Signature of Academic Chair(s) of the other academic area(s) is required on the signature sheet below.

Department responsible for staffing:

7. References. [Provide 3 - 5 references on which this course is based and/or support it.]


8. List Faculty Qualified to Teach This Course.
Nitika Parmar and other Biology faculty members

9. Effective Date and Frequency.
a. Projected semesters to be offered: Fall  Spring  Summer
b. First semester offered: Fall

10. New Resources Required. YES  NO
    If YES, list the resources needed and obtain signatures from the appropriate programs/units on the sheet below.
a. Computer (data processing), audio visual, broadcasting needs, other equipment

b. Library needs

c. Facility/space needs

11. Will this new course alter any degree, credential, certificate, or minor in your program? YES ☒ NO □
If YES attach a program modification form for all programs affected.

___________________________________________  9/28/2006
Nitika Parmar                               Date
Proposer of Course
## Approval Sheet

**Program/Course:** BIOL 405

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<tr>
<th>Chair(s)</th>
<th>Date</th>
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<td>Program Chair(s)</td>
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<td>General Education Chair(s)</td>
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<td>Curriculum Committee Chair(s)</td>
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<td>Dean of Faculty</td>
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