

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.

☐ Gen Ed

Graded

☐ CR/NC

☐ Repeatable for up to units

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 ☐ US History

2. Mode of Instruction.

	Units	Hours per Unit	Benchmark Enrollment	Graded Component	CS & HEGIS # (filled in by Dean)
Lecture	3	1	20	<input checked="" type="checkbox"/>	
Seminar				<input type="checkbox"/>	
Laboratory	1	3	20	<input checked="" type="checkbox"/>	
Activity				<input type="checkbox"/>	

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 ☐

B-3 Mathematics – Mathematics and Applications	<input type="checkbox"/>
B-4 Computers and Information Technology	<input type="checkbox"/>
C (Fine Arts, Literature, Languages & Cultures)	
C-1 Art	<input type="checkbox"/>
C-2 Literature Courses	<input type="checkbox"/>
C-3a Language	<input type="checkbox"/>
C-3b Multicultural	<input type="checkbox"/>
D (Social Perspectives)	<input type="checkbox"/>
E (Human Psychological and Physiological Perspectives)	<input type="checkbox"/>
UD Interdisciplinary	<input type="checkbox"/>

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.]*

1. "Bioprocess Engineering, Basic Concepts," 2nd Edition, Michael L. Shuler and Fikret Kargi, Prentice Hall, 2001. (ISBN: 0-13-081908-5)
2. "Biochemical Engineering", H. Blanch and D. Clark, Marcel Dekker, New York, 1996. (ISBN 0-8247-8949-0, hardcover; 0-8247-0099-6, softcover)
3. "Fermentation and Biochemical Engineering Handbook: Principles, Process Design, and Equipment", 2nd edition, Henry C. Vogel and Celeste C. Todaro, 1996. (ISBN: 0-8155-1407-7)
4. Supplemental: Essential Cell Biology (1998), Alberts, et al., Garland Publishing, New York (ISBN 0-8153-2971-7)

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.

Nitika Parmar

Proposer of Course

9/28/2006

Date

Approval Sheet

Program/Course: BIOL 405

Program Chair(s)	Date
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General Education Chair(s)	Date
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Curriculum Committee Chair(s)	Date
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Dean of Faculty	Date
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