CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

COURSE MODIFICATION PROPOSAL

Courses must be submitted by November 2, 2009, to make the next catalog (2010--2011) production

DATE (CHANGE DATE EACH TIME REVISED): 10-15-09; REV 12.8.09

PROGRAM AREA(S) : BIOLOGY

Directions: All of sections of this form must be completed for course modifications. All documents are stand alone sources of course information.

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1. Course Information.

[Follow accepted catalog format.] ***(Add additional prefixes i f cross-listed)***

OLD

Prefix BIOL Course# 505 Title MOLECULAR STRUCTURE Units (4)
3 hours lecture per week
3 hours blank per week

x Prerequisites: BIOL 400 or permission of instructor
Consent of Instructor Required for Enrollment
Corequisites:

Catalog Description (Do not use any symbols): This course will examine the structural biology of proteins. Topics include general principles of protein structure, the biochemical function of proteins, the relationship of protein structure to its function and experimental approaches to determining and predicting protein structure and function.

General Education Categories
Lab Fee Requested

Graded
CR/NC
x A - F

Repeatable for up to units
Total Completions

Course Level:
Undergraduate
Post-bac/Credential
x Graduate

Optional (Student's choice)

Multiple Enrollment in same semester

NEW

Prefix BIOL Course# 505 Title MOLECULAR STRUCTURE Units (4)
3 hours lecture per week
3hours blank per week

x Prerequisites: BIOL 504
x Consent of Instructor Required for Enrollment
Corequisites:

Catalog Description (Do not use any symbols)**:** Examines the structural biology of proteins. Topics include general principles of protein structure, the biochemical function of proteins, the relationship of protein structure to its function and experimental approaches to determining and predicting protein structure and function.

General Education Categories
Lab Fee Requested

Graded
CR/NC
x A - F

Repeatable for up to units
Total Completions

Course Level:
Undergraduate
Post-bac/Credential
x Graduate

Optional (Student's choice)

Multiple Enrollment in same semester

2. Mode of Instruction (Hours per Unit are defaulted) **Hegis Code(s)**_____
(Provided by the Dean)

Existing

	Units	Hours Per Unit	Benchmark Enrollment	Graded
Lecture	3	1	15	
Seminar		1		
Lab	1	3	15	
Activity		2		
Field Studies				
Indep Study				
Other blank				

Proposed

	Units	Hours Per Unit	Benchmark Enrollment	Graded	CS No. (filled out by Dean)
Lecture	3	1	15	x	
Seminar		1			
Lab	1	3	15	x	
Activity		2			
Field Studies					
Indep Study					
Other blank					

3. 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
- C-3b Multicultural

D (Social Perspectives)

E (Human Psychological and Physiological Perspectives)

UDIGE/INTD Interdisciplinary

Meets University Writing Requirement

Meets University Language Requirement

American Institutions, Title V Section 40404: Government US Constitution US History
Refer to website, Exec Order 405, for more information: http://senate.csuci.edu/comm/curriculum/resources.htm

Service Learning Course (Approval from the Center for Community Engagement must be received before you can request this course attribute).

4. Justification and Requirements for the Course. *[Make a brief statement to justify the need for the course]*

OLD	**NEW**
Molecular structure is a required course for graduate students in the Professional Master of Science Degree Program in Bioinformatics (Biotechnology emphasis).	Molecular structure is a required course for graduate students in the Biotechnology Emphasis of the Professional Master of Science Degree Program in Biotechnology and Bioinformatics. It is an elective course for the other emphases of the program.
x Requirement for the Major/Minor	x Requirement for the Major/Minor
x Elective for the Major/Minor	x Elective for the Major/Minor
Free Elective	Free Elective

Submit Program Modification if this course changes your program.

5. Learning Objectives. (List in numerical order. You may wish to visit resource information at the following website: http://senate.csuci.edu/comm/curriculum/resources.htm)

Upon completion of the course, the student will be able to: **OLD**	Upon completion of the course, the student will be able to: **NEW**
• Describe basic principles of protein structure including protein structure motifs, properties of alpha helices and beta sheets and protein folding.	• Describe and analyze basic principles of protein structure including protein structure motifs, properties of alpha helices and beta sheets and protein folding.
• Explain how a protein's conformation determines its biochemical activity.	• Examine how a protein's conformation determines its biochemical activity.
• Describe how a protein's structure enables binding to other molecules.	• Describe and analyze how a protein's structure enables binding to other molecules.
• Explain how a protein's function can be deduced from its primary structure.	• Explain and analyze how a protein's function can be deduced from its primary structure.
• Describe the techniques used for solving the 3-D structure of a protein.	• Describe and apply the techniques used for solving the 3-D structure of a protein.

6. Course Content in Outline Form. (Be as brief as possible, but use as much space as necessary)

OLD	NEW
I. Protein Sequence and Structure	I. Protein Sequence and Structure
Primary structure	Primary structure
Secondary Structure	Secondary Structure
Properties of the Alpha Helix and Beta sheet	Properties of the Alpha Helix and Beta sheet
Prediction of Secondary Structure	Prediction of Secondary Structure
Tertiary Structure	Tertiary Structure
Membrane Protein Structure	Membrane Protein Structure
Protein Stability	Protein Stability
The Protein Domain	The Protein Domain
Protein Motifs	Protein Motifs
Quaternary Structure	Quaternary Structure
II. Protein Structure and Function	II. Protein Structure and Function
The Structural Basis of Protein Function	The Structural Basis of Protein Function
Recognition, Complementarity and Active Sites	Recognition, Complementarity and Active Sites
Flexibility and Protein Function	Flexibility and Protein Function
Location and nature of Binding Sites	Location and nature of Binding Sites
Functional Properties of Structural Proteins	Functional Properties of Structural Proteins
Catalysis	Catalysis
Multifunctional Enzymes	Multifunctional Enzymes
III. Deducing protein function from Sequence	III. Deducing protein function from Sequence
Sequence Alignment and Comparison	Sequence Alignment and Comparison
Protein Profiling	Protein Profiling
Experimental Tools for Probing Protein Function	Experimental Tools for Probing Protein Function
Divergent and Convergent Evolution	Divergent and Convergent Evolution
Protein Superfamilies	Protein Superfamilies
Strategies for Identifying Binding Sites	Strategies for Identifying Binding Sites
Strategies for Identifying Catalytic Residues	Strategies for Identifying Catalytic Residues
IV. Protein Structure Determination	IV. Protein Structure Determination
The Interpretation of Structural Information	The Interpretation of Structural Information
Structure Determination by X-Ray Crystallography and NMR	Structure Determination by X-Ray Crystallography and NMR
Quality and Representation of Crystal and NMR Structures	Quality and Representation of Crystal and NMR Structures

Does this course content overlap with a course offered in your academic program? Yes ____ **No** x
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** x
If YES, what course(s) and provide a justification of the overlap. ____

Overlapping courses require Chairs' signatures.

7. 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).**
- **B. List each cross-listed prefix for the course:** ____
- **C. Program responsible for staffing:** ____

8. References. *[Provide 3-5 references]*

OLD

Lesk. (2001). Introduction to Protein Architecture: The structural biology of proteins. Oxford University Press.
Branden and Tooze. (1999) Introduction to Protein Structure, 2nd edition. Garland Publishing.
Fasman. (1989). Prediction of protein structure and the principles of protein conformation. Plenum Press.
McRee and David. (1999) Practical Protein Crystallography, 2nd edition. Academic Press.
Petsko and Ringe. (2003) Protein Structure and function. New Science Press.

NEW

Lesk. (2001). Introduction to Protein Architecture: The structural biology of proteins. Oxford University Press.
Branden and Tooze. (1999) Introduction to Protein Structure, 2nd edition. Garland Publishing.
Fasman. (1989). Prediction of protein structure and the principles of protein conformation. Plenum Press.
McRee and David. (1999) Practical Protein Crystallography, 2nd edition. Academic Press.
Petsko and Ringe. (2003) Protein Structure and function. New Science Press.
Crystallography Made Crystal Clear: A Guide for Users of Macromolecular Models, Gale Rhodes. Elsevier Science & Technology Books, February 16, 2006
Principles of Protein X-Ray Crystallography. Jan Drenth, Springer, November 10, 2006
Introduction to Macromolecular Crystallography, Alexander McPherson. Wiley, John & Sons, Incorporated, February 03, 2009

9. Tenure Track Faculty qualified to teach this course.
Biology faculty

10. Requested Effective Date or First Semester offered: W 2009

11. New Resource 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: Yes No (Refer to the Dean's Office for additional processing)
E. Other.

12. Indicate Changes and Justification for Each. *[Check all that apply and follow with justification. Be as brief as possible but, use as much space as necessary.]*

- Course title
- Prefix/suffix
- Course number
- Units
- Staffing formula and enrollment limits
- x Prerequisites/Corequisites
- x Catalog description
- Mode of Instruction
- Course Content
- Course Learning Objectives
- References
- GE
- Other
- Reactivate Course

Justification: Since BIOL 504 is a foundation course for the MS Biotechnology and Bioinformatics program, students are advised to take BIOL 504 early on during their program of study and then take other required and elective courses. However, in the last few years of offering the program, we realized that some students have postponed taking BIOL 504, sometimes to the last term. To make sure students complete their foundation course first, BIOL 504 is included as a prerequisite course for BIOL 505, which requires the knowledge of 504 for students to succeed.

13. Will this course modification alter any degree, credential, certificate, or minor in your program? Yes No x
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.
Last day to submit forms to be considered during the current academic year: April 15th.

Ching-Hua Wang — 10-15-09

Proposer(s) of Course Modification — Date
Type in name. Signatures will be collected after Curriculum approval.

Approval Sheet

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 Intl Affairs Director		
	Signature	Date
Center for Integrative Studies Director		
	Signature	Date
Center for Multicultural Engagement Director		
	Signature	Date
Center for Civic Engagement and Service Learning Director		
	Signature	Date
Curriculum Chair		
	Signature	Date
Dean of Faculty		
	Signature	Date