CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS COURSE MODIFICATION PROPOSAL Courses must be submitted by October 15, 2010, and finalized by the end of the fall semester to make the next catalog (2011-12) production

DATE (CHANGE DATE EACH TIME REVISED): 10.25.10;REV 12.9.10

PROGRAM AREA(S): CHEMISTRY

Directions: All of sections of this form must be completed for course modifications. Use YELLOWED areas to enter data. All documents are stand alone sources of course information.

1. Course Information.

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

OLD				NEW							
Prefix	CHEM	Course#	415	Title	MOLECULAR	Prefix	CHEM	Course#	415	Title	MOLECULAR
STRUCTURE DETERMINATION Units (4)					STRUCTURE DETERMINATION Units (4)						
3 hours lecture per week				3 hours lecture per week							
3 hours laboratory per week				3 hours laboratory per week							
		-					-	-			

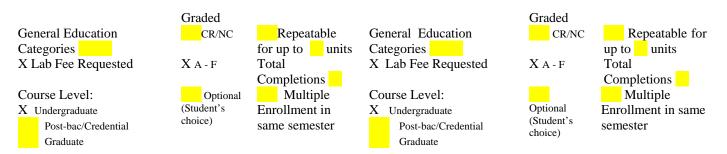
X Prerequisites: CHEM 305 (or concurrent enrollment),
CHEM 314, CHEM 315 or consent of instructor
Consent of Instructor Required for Enrollment

Corequisites:

Catalog Description (Do not use any symbols): This course will examine modern techniques for the determination of organic, inorganic, and biological molecular structure. Topics include X-ray crystallography, nuclear magnetic resonance spectroscopy, mass spectrometry, infrared spectroscopy, ultraviolet spectroscopy, and molecular modeling. X Prerequisites: CHEM 305 (or concurrent enrollment), CHEM 314, CHEM 315 or consent of instructor

Consent of Instructor Required for Enrollment Corequisites:

Catalog Description (Do not use any symbols): Examines modern techniques for the determination of the structure of organic and inorganic compounds. Topics include X-ray crystallography, nuclear magnetic resonance spectroscopy, mass spectrometry, infrared spectroscopy, ultraviolet spectroscopy, and molecular modeling.

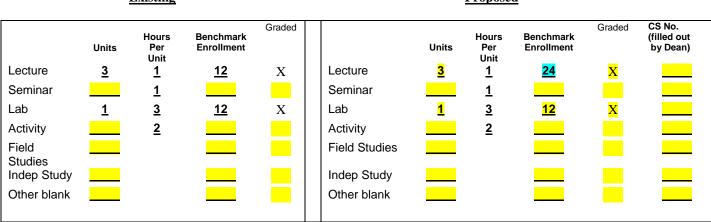


2. Mode of Instruction (Hours per Unit are defaulted)



Hegis Code(s)_____

(Provided by the Dean) **Proposed**



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).

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

OLD	NEW
Requirement for the Major/Minor	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. Student Learning Outcomes. (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

• Outline the development of the field of molecular structure determination.

• Describe how molecular shape can be determined through the use of X-ray crystallographic, spectroscopy (nuclear magnetic resonance, infrared, and ultraviolet spectroscopies), mass spectrometry, and molecular modeling.

• Describe how molecular shape, electronic structure, thermodynamics, kinetics, and intermolecular interactions affect molecular structure.

• Demonstrate the ability to use state-of-the-art scientific instrumentation in the determination of the structure of organic,

Upon completion of the course, the student will be able to: NEW

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• Describe how molecular shape can be determined through the use of X-ray crystallographic, spectroscopy (nuclear magnetic resonance, infrared, and ultraviolet spectroscopies), mass spectrometry, and molecular modeling.

• Describe how molecular shape, electronic structure, thermodynamics, kinetics, and intermolecular interactions affect molecular structure.

• Demonstrate the ability to use state-of-the-art scientific instrumentation in the determination of the structure of organic

inorganic and biochemical molecules. and inorganic molecules. · Compare strengths and limitations of various techniques used · Compare strengths and limitations of various techniques used to determine molecular structure. to determine molecular structure. • Describe how the various molecular structure determination • Describe how the various molecular structure determination techniques and instrumentation work techniques and instrumentation work • Determine the structure of an organic, inorganic, or biological • Determine the structure of an organic, inorganic, or biological molecule using X-ray crystallography; nuclear magnetic molecule using X-ray crystallography; nuclear magnetic resonance, infrared, and ultraviolet spectroscopies; mass resonance, infrared, and ultraviolet spectroscopies; mass spectrometry; and molecular modeling. spectrometry; and molecular modeling. • Interpret, discuss, and evaluate a primary literature article • Interpret, discuss, and evaluate a primary literature article 6. Course Content in Outline Form. (Be as brief as possible, but use as much space as necessary) OLD NEW Molecular Modeling Molecular Modeling Conformational Equilibria Conformational Equilibria X-ray Crystallography X-ray Crystallography Proton NMR Proton NMR Carbon NMR Carbon NMR Other Nuclei NMR Other Nuclei NMR Correlation NMR Correlation NMR Dynamic NMR Dynamic NMR Nuclear Overhauser Effect Nuclear Overhauser Effect Mass Spectrometry Mass Spectrometry Infrared Spectroscopy Infrared Spectroscopy Ultraviolet and Chiroptical Spectroscopy Ultraviolet Spectroscopy 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. No X Does this course content overlap a course offered in another academic area? Yes 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

Crews, P.; Rodriguez, J.; Jaspars, M. Organic Structure Analysis, Topics in Organic Chemistry, Oxford University Press, 1998.

Lambert, J. B.; Shurvell, H. F.; Lightner, D. A.; Cooks, R. G. Organic Structural Spectroscopy, MacMillen, 1st Ed, 1997.

Silverstein, R. M.; Webster, F. X. Spectrometric Identification of Organic Compounds, Wiley, 1st Ed., 1997.

Friebolin, H.; Becconsall, J. K. *Basic One- and Two-Dimensional NMR Spectroscopy*, Oxford University Press, 3^{ra} Revised Ed., 1998. Braun, S.; Kalinowski, H.-O.; Berger, S. *100 and More Basic NMR Experiments: A Practical Course*, Taylor and Francis, 1996.

Field, L. D.; Sternhell, S.; Kalman, J. R. Organic Structures from Spectra, Elsevier, 3rd Ed., 2002.

NEW

Simpson, J. H. *Organic Structure Determination: Using 2D NMR Spectroscopy*, Elsevier, 2008. Neil E. Jacobsen, NMR Spectroscopy Explained, Wiley, 2007 Silverstein, R. M.; Webster, F. X.; Kiemle, D. J. Spectrophotometric Identification of Organic Compounds, Seventh Ed., Wiley, 2005. Crews, P.; Rodriguez, J.; Jaspars, M. *Organic Structure Analysis, Topics in Organic Chemistry*, Oxford University Press, 1998. Lambert, J. B.; Shurvell, H. F.; Lightner, D. A.; Cooks, R. G. *Organic Structural Spectroscopy*, MacMillen, 1st Ed, 1997. Field, L. D.; Sternhell, S.; Kalman, J. R. *Organic Structures from Spectra*, Elsevier, 3rd Ed., 2002.

9. Tenure Track Faculty qualified to teach this course.

Philip Hampton

- 10. Requested Effective Date or First Semester offered: Spring 2011
- 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 X (already approved) 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
Prerequisites/Corequisites
Catalog description

Mode of Instruction

X Course Content
X Course Learning Outcomes
X References
GE
Other
Reactivate Course

Justification: The Chemistry Program determined that it was not possible to cover the content of organic, inorganic, and biological molecular structure determination in a single semester-long course. This course has been modified so that it focuses on the determination of the molecular structure of small molecules consisting of organic and inorganic compounds.

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 4, 2010 of preceding year.	
	Priority deadline for Course Proposals and Modifications: October 15, 2010.	
	Last day to submit forms to be considered during the current academic year: April 15 th .	

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

Date

Approval Sheet

Course: CHEM 415

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
Contor for Intl Affaire Director		
Center for Intl Affairs Director		
	Signature	Date
Center for Integrative Studies		
Director		D /
	Signature	Date
Center for Multicultural		
Engagement Director		
	Signature	Date
Center for Civic Engagement and Service Learning Director		
	Signature	Date
	Cignataro	Dato
Curriculum Chair		
	Signature	Date
Dean of Faculty		
	Signature	Date