CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

COURSE MODIFICATION PROPOSAL

Courses must be submitted by November 5, 2007, to make the next catalog production

DATE (CHANGE DATE IF REVISED): 10/31/2007 REV 11.29.07

PROGRAM AREA(S) : CHEMISTRY

1. Catalog Description of the Course. *[Follow accepted catalog format.]*
(If Cross-listed please submit prefixes for each discipline being modified)

OLD

Prefix CHEM Course# 318 Title Biological Chemistry Units (3)
3 hours lecture per week
hours blank per week

☒ Prerequisites: CHEM 311 with a grade of C or better
☐ Corequisites:
Description (Do not use any symbols): An integrated Organic Chemistry II and Biochemistry course for biology students. The topics covered in this course include: the structure and synthesis of sugars, amino acids, DNA, RNA, proteins; enzyme catalysis and inhibition; and the reactions involved in biosynthetic and metabolic pathways. Students who are interested in pre-professional programs (pre-medical, pre-veterinary, pre-dental) or students interested in obtaining a minor in Chemistry should take CHEM 314. Intended for the non-chemistry major.

☐ Gen Ed Categories
☐ Lab Fee Required
Graded ☐ CR/NC ☒ A - F ☐ Optional (Student's choice)
☐ Repeatable for up to units
☐ Multiple Enrollment in same semester

NEW

Prefix CHEM Course# 318 Title Biological Chemistry Units (3)
3 hours lecture per week
hours blank per week

☒ Prerequisites: CHEM 311 with a grade of C or better
☐ Corequisites:
Description: An integrated Organic Chemistry II and Biochemistry course for non-chemists. The topics covered in this course include: the structure and synthesis of sugars, amino acids, DNA, RNA, proteins; enzyme catalysis and inhibition; and the reactions involved in biosynthetic and metabolic pathways. Chem 318 will not count for credit in the Chemistry major or minor.

☐ Gen Ed Categories
☐ Lab Fee Required
Graded ☐ CR/NC ☒ A - F ☐ Optional (Student's choice)
☐ Repeatable for up to units
☐ Multiple Enrollment in same semester

☐ American Institutions, Title V Section 40404: ☐Government ☐US Constitution ☐US History (Refer to EO 405, for more information at: http//senate.csuci.edu/comm/curriculum/resources.htm
☐ Service Learning Course

2. Mode of instruction (Hours per Unit are set for you) **Hegis Code(s)_____**

Existing

	Units	Hour Per Unit	Benchmark Enrollment	CS# Units (filled out by Dean)
Lecture	3	1	50	
Seminar		1		
Laboratory		3		
Activity		2		
Field Studies				
Indep Study				
Other blank				

Proposed

	Units	Hour Per Unit	Benchmark Enrollment	CS# Units (filled out by Dean)
Lecture	3	1	50	
Seminar		1		
Laboratory		3		
Activity		2		
Activity		2		
Activity		2		
Activity		2		

3. Course Content in Outline Form if Being Changed. *[Be as brief as possible, but use as much space as necessary]*

OLD

Aromaticity and Aromatic Compounds
Aromatic and heteroaromatic compounds
Hückel's Rule and molecular orbital description of aromatic

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Aromatic and heteroaromatic compounds
Hückel's Rule and molecular orbital description of aromatic

compounds
Heterocycles in proteins and nucleic acids
Reactions of aromatic compounds
Biosynthesis of aromatic compounds
Alcohols: Structures and Reactions
Acid-base reactivity of alcohols and phenols and substituent effects on acidity
Synthesis and reactions of alcohols
Biosynthesis and biological reactions of alcohols
Aldehydes and Ketones: Structures and Reactions
Synthesis and reactions of aldehydes and ketones
Biosynthesis and biological reactions of aldehydes and ketones
Carbohydrates: Structures and Reactions
Names and structures of monosaccharides
Reactions of monosaccharides
Glycoside formation
Disaccharides and polysaccharides
Carboxylic Acids: Structures and Reactions
Acid-base reactions of carboxylic acids
Synthesis and reactions of carboxylic acids
Biosynthesis and biological reactions of carboxylic acids
Fatty acids, triglycerides, and phospholipids
Carboxylic Acid Derivatives and their Preparation
Structures and reactivity of esters, thioesters, phosphoesters, amides, and nitriles
Carboxylic acid derivatives in biological systems
Organization of phospholipids into micelles, bilayers, and vesicles
Nucleic Acids
DNA and RNA structure
Replication and transcription of DNA
Amines: Structures and Reactions
Acid-base reactions of amines
Chemical synthesis and reactions of amines
Biosynthesis and biological reactions of amines
Protein Structure
Amino acid structures and properties
Peptide bonds and olidopeptide structure
Translation of mRNA
Aspects of protein and polypeptide structure
X-ray crystallography
Chemical synthesis and biosynthesis of peptides
Enzyme catalysis and kinetics
Enzyme inhibition and kinetics
Cooperativity and allosteric effects
Sequence homology of proteins
Biochemical Pathways
Glucose: catabolism, anabolism, energy generation, and glucose storage
Fat: catabolism, anabolism, energy generation, and fat storage
Protein: catabolism, anabolism, energy

compounds
Heterocycles in proteins and nucleic acids
Reactions of aromatic compounds
Biosynthesis of aromatic compounds
Alcohols: Structures and Reactions
Acid-base reactivity of alcohols and phenols and substituent effects on acidity
Synthesis and reactions of alcohols
Biosynthesis and biological reactions of alcohols
Aldehydes and Ketones: Structures and Reactions
Synthesis and reactions of aldehydes and ketones
Biosynthesis and biological reactions of aldehydes and ketones
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Names and structures of monosaccharides
Reactions of monosaccharides
Glycoside formation
Disaccharides and polysaccharides
Carboxylic Acids: Structures and Reactions
Acid-base reactions of carboxylic acids
Synthesis and reactions of carboxylic acids
Biosynthesis and biological reactions of carboxylic acids
Fatty acids, triglycerides, and phospholipids
Carboxylic Acid Derivatives and their Preparation
Structures and reactivity of esters, thioesters, phosphoesters, amides, and nitriles
Carboxylic acid derivatives in biological systems
Organization of phospholipids into micelles, bilayers, and vesicles
Nucleic Acids
DNA and RNA structure
Replication and transcription of DNA
Amines: Structures and Reactions
Acid-base reactions of amines
Chemical synthesis and reactions of amines
Biosynthesis and biological reactions of amines
Protein Structure
Amino acid structures and properties
Peptide bonds and olidopeptide structure
Translation of mRNA
Aspects of protein and polypeptide structure
X-ray crystallography
Chemical synthesis and biosynthesis of peptides
Enzyme catalysis and kinetics
Enzyme inhibition and kinetics
Cooperativity and allosteric effects
Sequence homology of proteins
Biochemical Pathways
Glucose: catabolism, anabolism, energy generation, and glucose storage
Fat: catabolism, anabolism, energy generation, and fat storage
Protein: catabolism, anabolism, energy generation

4. 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]*

OLD

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additional eight units of chemistry courses (CHEM 314, CHEM 315, and CHEM 400), biology students may elect to complete their chemistry requirements with CHEM 318, which is a combination of highlights of CHEM 314 and CHEM 400. Students who are interested in admission to medical, veterinary, dental, or pharmacy schools should take the combination of CHEM 314, CHEM 315, and CHEM 400.

The course is designed to provide the student with a basic knowledge of the following:

- The scientific method and how it is used to approach scientific problems in organic chemistry and biochemistry
- History of the development of the field of organic chemistry and biochemistry
- Geometric and electronic structures of organic and biological molecules
- Biological molecules, their chemical properties, and their biochemistry
- Relationship between enzyme catalyzed reactions and reactions performed in the laboratory

Students who successfully complete this course will be able to:

- Outline the development of the fields of organic chemistry and biochemistry from a historical perspective and how organic chemistry and biochemistry have impacted society
- Describe the scientific method and how it is used to approach the study of organic and biological molecules
- Explain the behavior of organic and biological reactions using their knowledge of thermodynamics and kinetics and the geometric and electronic structures of organic and biological molecules
- Identify the reactions, chemical synthesis, and biosynthesis of alcohols, ethers, aldehydes, ketones, esters, carboxylic acids, amides, and amines
- Compare and contrast chemical synthesis with biosynthesis
- Describe major biochemical pathways, energy flow, and the reaction processes
- Describe the structure and properties of carbohydrates, amino acids, proteins, enzymes, nucleic acids, RNA, DNA, prostaglandins, terpenes, steroids, fatty acids, triglycerides, and phospholipids

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

OLD McMurray, J. Organic Chemistry, 5th Ed., 2000
Weeks, D. P. Pushing Electrons, 3rd Ed., 1998
Wade, L. G., Jr. Organic Chemistry, 5th Ed., 2002
Bruice, P. Organic Chemistry, 3rd Ed., 2000

NEW McMurray, J. Organic Chemistry, 5th Ed., 2000
Weeks, D. P. Pushing Electrons, 3rd Ed., 1998
Wade, L. G., Jr. Organic Chemistry, 5th Ed., 2002
Bruice, P. Organic Chemistry, 3rd Ed., 2000

6. 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
☐ Course content
☐ References
☐ GE
☐ Other

Justification: Makes it more clear that credit will not be given for CHEM 318 (an integrated organic and biochemistry course) and CHEM 314 (Organic Chemistry II) or CHEM 460 (Biochemistry I). There is significant overlap of content in these courses, and students should not get credit for both.

7. ☐ **General Education Categories**: All courses with GE categories notations (including deletions) must be processed at 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) ☐
UD Interdisciplinary ☐

8. New Resources Required. YES ☐ NO ☒
If YES, list the resources needed and obtain signatures from the appropriate programs/units on the consultation sheet below.

a. Computer (data processing), audio visual, broadcasting needs, other equipment)

b. Library needs

c. Facility/space needs

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

10. Effective Date (Semester and Year – all modifications submitted prior to November 5th will be effective in the Fall 2008 catalog):

Simone Aloisio — Proposer of Course Modification
10/31/2007 — Date

Approvals
Program/Course: CHEM 318

Program Chair		
	Signature	Date
Program Chair		
	Signature	Date
Program Chair		
	Signature	Date
General Education Chair		
	Signature	Date
Service Learning Center Director		
	Signature	Date
Curriculum Chair		
	Signature	Date
Dean of Faculty		
	Signature	Date