CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

COURSE MODIFICATION PROPOSAL

Courses must be submitted by November 3, 2008, to make the next catalog (2009-2010) production

DATE (CHANGE DATE EACH TIME REVISED): 10/2/2008 REV 11.3.08

PROGRAM AREA(S) : CHEMISTRY

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 CHEM Course# 121 Title
GENERAL CHEMISTRY I
Units (4)
3 hours lecture per week
1 hours blank per week

Prerequisites: CHEM 105 or 1 Year of High School Chemistry

Consent of Instructor Required for Enrollment
Corequisites:

Catalog Description (Do not use any symbols):
An introductory chemistry course which provides an overview of the chemical and physical behavior of matter with a focus on qualitative and quantitative general inorganic, physical, and analytical chemistry. Lab fee required.

General Education Categories B1
X Lab Fee Requested

Course Level:
X Undergraduate
Post-bac/Credential
Graduate

Graded
CR/NC
X A - F

Optional (Student's choice)

Repeatable for up to units
Total Completions
Multiple Enrollment in same semester

NEW

Prefix CHEM Course# 121 Title
GENERAL CHEMISTRY I
Units (4)
3 hours lecture per week
3hours laboratory per week

Prerequisites:
A passing score on the Chemistry Placement Examination or CHEM 105

Consent of Instructor Required for Enrollment
Corequisites:

Catalog Description (Do not use any symbols)**:**
An introductory chemistry course which provides an overview of the chemical and physical behavior of matter with a focus on qualitative and quantitative general inorganic, physical, and analytical chemistry. Lab fee required.

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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	36	
Seminar		1		
Lab	1	3	18	
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	72	x	
Seminar		1			
Lab	1	3	24	x	
Activity		2			
Field Studies					
Indep Study					
Other blank					

3. Course Attributes:

B-1 **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)
- X 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
This course is the first semester of a two-semester sequence that is generally an admission requirement for medical, veterinary, dental, or pharmacy schools. This course is a Category B1 general education course and is required for the B.S. degrees in Biology and in Environmental Science and Resource Management. It is also prerequisite for CHEM 122, which is required for a large number of chemistry and biology courses.

Requirement for the Major/Minor
Elective for the Major/Minor

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X Requirement for the Major/Minor
Elective for the Major/Minor

Submit Program Modification if this course changes your program.

5. Learning Objectives. (List in numerical order)

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

OLD
Students who successfully complete this course will be able to:

- Evaluate a scientific measurement and distinguish between scientific data
- Describe matter and energy in terms of the units and terminology that is used by modern scientists
- Identify schochiometric relationships and balance chemical equations

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• Explain the structure of an atom in terms of its basic parts and properties
• Explain the interaction between electrons and light quantitatively
• Describe the properties of electrons and how they relate to chemical reactivity
• Identify the chemical properties of elements based on their periodic trends
• Explain the nature of the different types of chemical bonds in molecules
• Evaluate the properties of a gas phase species
• Explain simple kinetics of reactions
• Rationalize chemical reactivity in terms of the thermodynamic properties of reactants and products

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

OLD

Scientific Measurement
- The scientific method
- SI units and the metric system
- Significant Figures
- Scientific Notation
- Unit Conversion
- Mass and Energy Units

Matter and Energy
- States of Matter
- Pure substances and mixtures
- Atoms and Molecules
- Temperature
- Physical properties
- Chemical Properties

Stoichiometry
- The mole
- Avagadro's Number
- The chemical equation
- Balancing chemical equations
- Mole-to-Mass conversion
- Solutions
- Dilutions

Atoms and Elements
- Names and Symbols
- The nuclei of atoms
- X-rays
- Nuclear chemistry
- Radioactivity
- Fission and Fusion

Electrons and Photons
- Particle-Wave duality
- Electron arrangement in atoms
- Intro to quantum theory
- The photoelectron effect
- Atomic spectra
- The uncertainty principle
- Atomic Orbitals
- Valence

The Periodic Table
- History of the periodic table
- Metals and non-metals

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The Periodic Table
- History of the periodic table
- Metals and non-metals
- Periodic trends

Periodic trends
Main group elements
Transition metals
Electron affinity
Ionization
The Chemical Bond
Ionic bonds
Covalent bonds
Electronegativity
Lewis structures
Resonance
Oxidation number of atoms
The shape of molecules
Polarity
Hydrogen bonding
Gases
Pressure and temperature
Partial pressure
Ideal gas equation

Main group elements
Transition metals
Electron affinity
Ionization
The Chemical Bond
Ionic bonds
Covalent bonds
Electronegativity
Lewis structures
Resonance
Oxidation number of atoms
The shape of molecules
Polarity
Hydrogen bonding

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

Pauling, L. General Chemistry, 3rd Ed., Dover, 1970
Chang, R. Chemistry, 7th Ed., McGraw Hill, 2001
Pertucci, R.H.; Harwood, W.S.; Herring, G. General Chemistry, 8th Ed., Prentice Hall, 2001
Burns, R.A.A. Fundamentals of Chemistry, 8th Ed., Prentice Hall, 2001
Zumdahl, S.S.; Zumdahl, S. Chemistry, Houghton Mifflin, 2000

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9. Tenure Track Faculty qualified to teach this course.
Simone Aloisio, Blake Gillespie, Phil Hampton

10. Requested Effective Date or First Semester offered: Fall 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
- [ ] Catalog description
- [ ] Mode of Instruction
- [ ] Course Content
- [ ] Course Learning Objectives
- [ ] References
- [ ] GE
- [ ] Other
- [ ] Reactivate Course

Justification: Originally, the pre-requisite was listed as we are now proposing. We never chose or developed a chemistry placement exam however. The current requirement is not a sufficient predictor of student success in the course. This course has an attrition rate of about 1/3 of the students each semester. In Fall 2007, 44% of the students that were enrolled in the course at census received a grade of D,W,I,or F. A grade of "C" or better is required to advance in chemistry courses. General chemistry I was one of the two courses studied by the CSU in their Transforming Course Design (TCD) initiative last academic year (2007-2008). The use of a predictor exam for the course was recomended by the TCD team, which consisted of ten CSU chemistry professors from ten different campuses with experience teaching general chemistry. This year, we are piloting the California Chemistry Diagnostic Exam as the Chemistry Placement Exam. This is the same exam that is used at SFSU.

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 6, 2008 of preceding year.
Priority deadline for Course Proposals and Modifications: November 3, 2008.
Last day to submit forms to be considered during the current academic year: April 15th.

Simone Aloisio — 10/2/08

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

Request for CHEM 121: GENERAL CHEMISTRY I to be added to GE Category B1: Physical Sciences -- Chemistry, Physics, Geology, and Earth Sciences.

Committee Response:
Approved by committee on 10-16-2008

Criteria and Justifications Submitted:

- *Promote the understanfing and appreciation of the methodologies of math or science as investigative tools and the limitations of mathematical or scientific endeavors*
  This course will examine basic chemistry principles. The course will discuss the Scientific Method and how it is applied to Chemistry problems, and the limitations of the Scientific Method. In addition, the strengths and limitations of chemistry methodologies will be examined.
- *Present mathematical or scientific knowledge in a historical perspective and the influences of math or science on the development of world civilizations, both past and present*
  The course will present a historical perspective on the development of the field of chemistry and the impact of these chemical developments on civilization will be discussed.
- *Apply inductive and deductive reasoning processes and explore fallacies and misconceptions in the mathematical or scientific areas*
  The application of deductive and inductive reasoning processes is fundamental to the understanding of general chemistry. Students in the course will be taught how to reason from experimental data to form conclusions regarding chemical concepts. In addition to presenting examples of good reasoning, students will learn to differentiate good reasoning from fallacies, misconceptions and poor reasoning, for example in the alleged “memory properties” of water in high dilutions of homeopathic medicines.
- *Present the principles and concepts of the physical sciences and the physical universe*
  The course will focus on a discussion of chemistry principles and concepts and their impact on society.

Approval Sheet

Course: Chem 121

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