

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): 10/10/2008 REV 10.21.08

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.

1. Course Information.

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

OLD

Prefix CHEM Course# 301 Title Environmental Chemistry
 Units (3)
 3 hours lecture per week
 hours blank per week

X Prerequisites: CHEM 122 with a grade of "C" or better
 Consent of Instructor Required for Enrollment
 Corequisites:

Catalog Description (Do not use any symbols):

An introductory course to the chemistry of the environment. The goal of this course is to teach the fundamental natural chemical processes of the atmosphere, oceans and soil of the Earth, as well as the anthropogenic effects on this system. Current topics of environmental interest will be discussed. The sciences behind these processes will be the focus of this course.

NEW

Prefix CHEM Course# 301 Title Environmental Chemistry - Atmosphere and Climate
 Units (3)
 3 hours lecture per week
 hours blank per week

X Prerequisites: CHEM 122 with a grade of "C" or better
 Consent of Instructor Required for Enrollment
 Corequisites:

Catalog Description (Do not use any symbols):

An introductory course to the chemistry of the atmosphere. The focus is the fundamental natural chemical processes of the atmosphere, as well as the anthropogenic effects on this system. These include climate change and other current topics of environmental interest and the science behind these processes.

General Education Categories Lab Fee Requested
 Graded CR/NC A - F
 Repeatable for up to units Total Completions Multiple Enrollment in same semester
 Course Level: Undergraduate Post-bac/Credential Graduate
 Optional (Student's choice)

General Education Categories Lab Fee Requested
 Graded CR/NC A - F
 Repeatabl for up to units Total Completions Multiple Enrollment in same semester
 Course Level: X Undergraduate Post-bac/Credential Graduate
 Optional (Student's choice)

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

Hegis Code(s) _____
 (Provided by the Dean)

Existing

Proposed

	Units	Hours Per Unit	Benchmark Enrollment	Graded		Units	Hours Per Unit	Benchmark Enrollment	Graded	CS No. (filled out by Dean)
Lecture	3	1	24		Lecture	3	1	24		
Seminar		1			Seminar		1			
Lab		3			Lab		3			
Activity		2			Activity		2			
Field Studies					Field Studies					
Indep Study					Indep Study					
Other blank					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

People are becoming increasingly interested in environmental issues, especially human impact on the environment. Issues such as climate change and gasoline additives in drinking water are areas of reasonably large interest to many people. Understanding the basic science behind such issues is needed for people to make informed judgments as citizens and decision makers. This course is designed for the student to have basic knowledge of the chemistry involved in historical and current environmental issues. This course also provides a vehicle for otherwise intimidated students to be introduced to science via a well-received topic. Furthermore, this course can fulfill an upper division science elective for Environmental Science and Resource Management majors whose emphasis is environmental science. It will also be chemistry elective for biology majors who want to learn more on the subject, as well as for chemistry minors. These students will already be taken the prerequisite CHEM 122.

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

NEW

People are becoming increasingly interested in environmental issues, especially human impact on the environment. Issues such as climate change and gasoline additives in drinking water are areas of reasonably large interest to many people. Understanding the basic science behind such issues is needed for people to make informed judgments as citizens and decision makers. This course is designed for the student to have basic knowledge of the chemistry involved in historical and current environmental issues. This course also provides a vehicle for otherwise intimidated students to be introduced to science via a well-received topic. Furthermore, this course can fulfill an upper division science elective for Environmental Science and Resource Management majors whose emphasis is environmental science. It will also be chemistry elective for biology majors who want to learn more on the subject, as well as for chemistry minors. These students will already be taken the prerequisite CHEM 122.

- 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

9.15.08 km2

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

NEW

Students who successfully complete this course will be able to:

- Understand the scientific method and how it is used to approach scientific problems
- Identify the scientific principles that form the basis for environmental chemistry; including water, air and soil chemistry in the natural and polluted state
- Recognize important aqueous phase oxidation and reduction chemical reactions
- Distinguish current and past anthropogenic forcing on the Earth system
- Explain elementary gas phase kinetics and how it effects atmospheric chemistry
- Describe soil chemistry, including the important cycles and exchanges taking place in the geosphere
- Identify different types of hazardous waste and be able to explain the meanings of each type
- Consider the options in dealing with hazardous waste and anthropogenic emissions
- Explain the scientific principles behind environmental analysis techniques

Students who successfully complete this course will be able to:

- Describe the scientific method and how it is used to approach scientific problems
- Identify the scientific principles that form the basis for environmental chemistry of air in the natural and polluted state
- Recognize important gas phase oxidation and reduction chemical reactions
- Distinguish current and past anthropogenic forcing on the Earth's atmosphere
- Explain elementary gas phase kinetics and how it effects atmospheric chemistry
- Identify renewable and non-renewable sources of energy and how they affect our environment
- Explain the scientific principles behind environmental analysis techniques, both in the laboratory and in remote sensing experiments.

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

OLD

Planet Earth and the Environment
The hydrosphere, atmosphere, lithosphere and biosphere
The scientific method
Environmental science and chemistry
Fundamentals of Aqueous Phase Chemistry
Chemical Reactions
Chemical Equilibrium
Solutions
Ions and Molecules
Types of Reactions
Oxidation-Reduction
Oxidation States
Nernst Equation
Redox Cycles
Corrosion
Phase Interactions
Formation of Sediments
Solubility
Henry's Law
Colloidal Particles
Ion Exchange
Aquatic Microbial Biochemistry
Algae, Fungi and Bacteria
Biodegradation
Nitrogen Fixation
Phosphorus and Sulfur Cycles
Water Pollution
Elemental Pollutants/Heavy Metals
Organic Metals
Inorganic Species
Organic Pollutants
Radionuclides
Water Treatment
Municipal Drinking Water
Waste Water

NEW

Formation of the Atmosphere
Scientific Method
Planetary Atmospheres
Pre-biotic Atmosphere and Rise of Oxygen
Formation of the Ozone Layer
Structure of the Atmosphere
The layered Atmosphere
Temperature and Pressure profile
Concentration Units for Gasses
Light and the Solar Spectrum
Photochemical Reactions
Chemistry of the Stratosphere
Absorption by Oxygen and Ozone
Chapman Cycle and the Steady State Approximation
Kinetics
Radicals in our Atmosphere
Catalytic Ozone Destruction
Antarctic Ozone Hole
CFCs and Atmospheric Mixing
A historical perspective of the study of the Ozone Hole
Chemistry of the Troposphere
Atmospheric Lifetime
Hydroxyl Radical
Acid Precipitation and Deposition
Henry's Law
Particulate Matter
Smog and Tropospheric Ozone
Health affects and air quality
Oxidation of Volatile Organic Compounds
Climate Change
Solar Radiation and Temperature
Greenhouse Gasses
Radiative Forcing
Aerosols and Clouds
Climate Change to Date and Climate Variability
Climate Predictions

Osmosis
Disinfections
Atmospheric Chemistry
Solar Radiation
Gas Phase Kinetics
Tropospheric Gas Phase Processes
Stratospheric Processes
Particles in the Atmosphere
Physical Processes
Chemical Processes
Gaseous Inorganic Pollutants
Sulfur Cycle
Nitrogen Cycle

Energy
Fossil Fuels
Non-renewable Energy
Renewable Energy
Remote Sensing and Laboratory Techniques

Does this course content overlap with a course offered in your academic program? Yes No

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

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

Schwarzenbach, R.P.; Gschwend, P.M.; Imboden, D.M. Environmental Organic Chemistry, 2nd Ed., Wiley, 2002
Baird, C. Environmental Chemistry, 2nd Ed., Freeman, 1998
Manahan, S. Environmental Chemistry, 7th Ed., Lewis Publishers, 1999.
Williams, I. Environmental Chemistry, Wiley, 2001.

NEW

Baird, C. Environmental Chemistry, 4th Ed., Freeman, 2008
Manahan, S. Environmental Chemistry, 8th Ed., Lewis Publishers, 2006.
International Panel on Climate Change (IPCC) Fourth Assessment Report (AR4), <http://www.ipcc.ch/>, 2007

9. Tenure Track Faculty qualified to teach this course.

Simone Aloisio

10. Requested Effective Date or First Semester offered: **Fall 2009**

11. New Resource Requested: Yes No

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.]

- | | |
|---|--|
| <input checked="" type="checkbox"/> Course title | <input checked="" type="checkbox"/> Course Content |
| <input type="checkbox"/> Prefix/suffix | <input checked="" type="checkbox"/> Course Learning Objectives |
| <input type="checkbox"/> Course number | <input checked="" type="checkbox"/> References |
| <input type="checkbox"/> Units | <input type="checkbox"/> GE |
| <input type="checkbox"/> Staffing formula and enrollment limits | <input type="checkbox"/> Other <input type="checkbox"/> |
| <input type="checkbox"/> Prerequisites/Corequisites | <input type="checkbox"/> Reactivate Course |
| <input checked="" type="checkbox"/> Catalog description | |
| <input type="checkbox"/> Mode of Instruction | |

Justification: We are proposing a new course (CHEM 302) focusing on the aqueous, geochemical, and toxicological aspects of environmental chemistry. This would then focus primarily on atmospheric chemistry, climate change and energy concerns. With the growth in the depth of knowledge, importance, and interest in environmental chemistry, two courses in this field will provide richer content choices for students.

13. **Will this course modification alter any degree, credential, certificate, or minor in your program?** Yes No

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

10/10/2008

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		
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Signature

Date

Program Chair		
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Signature

Date

Program Chair		
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Signature

Date

General Education Chair		
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Signature

Date

Center for Intl Affairs Director		
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Signature

Date

Center for Integrative Studies Director		
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Signature

Date

Center for Multicultural Engagement Director		
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Signature

Date

Center for Civic Engagement and Service Learning Director		
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Signature

Date

Curriculum Chair		
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Signature

Date

Dean of Faculty		
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Signature

Date