

NEW COURSE PROPOSAL**Courses must be submitted by November 3, 2008, for priority catalog review.**DATE (*Change if modified and redate file with current date*)

10/8/2008 REV 12.4.08

PROGRAM AREA(S)

CHEMISTRY

1. Course Information. *[Follow accepted catalog format.]***Prefix(es)** (Add additional prefixes if cross-listed) and **Course No.** CHEM 302**Title:** ENVIRONMENTAL CHEMISTRY – SOIL AND WATER **Units:** 4☒ Prerequisites CHEM 122 with a grade of C or better☐ Corequisites ☐☐ Consent of Instructor Required for Enrollment**Catalog Description** (Do not use any symbols):

Examines the environmental chemistry of the geosphere and the hydrosphere. Natural and anthropogenic effects on the environment in these systems, including effects on living organisms, hazardous waste and its disposal, and measures to alleviate and prevent environmental problems will be discussed. Includes a laboratory for experiments analyzing water, soil, and tissue samples for pollutants.

Grading Scheme:☒ A-F Grades☐ Credit/No Credit☐ Optional (Student Choice)**Repeatability:**☐ Repeatable for a maximum of ☐ unitsTotal Completions Allowed ☐☐ Multiple Enrollment in Same Semester**Course Level Information:**☒ Undergraduate☐ Post-Baccalaureate/Credential☐ Graduate**Mode of Instruction/Components** (*Hours per Unit are defaulted*).

	Units	Hours per Unit	Benchmark Enrollment	Graded Component	CS & HEGIS # (Filled in by the Dean)
Lecture	3	1	18	☒	
Seminar	☐	1	☐	☐	
Laboratory	1	3	18	☒	
Activity	☐	2	☐	☐	
Field Studies	☐		☐	☐	
Indep Study	☐		☐	☐	
Other Blank	☐		☐	☐	

Leave the following hours per week areas blank. The hours per week will be filled out for you.

3 hours ☐ lecture per week3 hours ☐ laboratory per week**2. 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).

3. Justification and Requirements for the Course. (Make a brief statement to justify the need for the course)

A. Justification: This course is an upper division elective for the chemistry majors that meets the lab elective. It will also be an elective for Biology majors in the Ecology, Evolution, and Organismal Biology Emphasis; and for ESRM majors in the Environmental Science emphasis. This class would complement our current environmental chemistry course (CHEM 301), which 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.

B. Degree Requirement: ☐ Requirement for the Major/Minor

☒ Elective for the Major/Minor

Note: Submit Program Modification if this course changes your program.

4. Learning Objectives. (List in numerical order)

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

☐ 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 of water and soil chemistry in the natural and polluted state
- Recognize important aqueous phase oxidation and reduction chemical reactions
- 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
- Describe the options in dealing with hazardous waste and anthropogenic emissions
- Explain the scientific principles behind environmental analysis techniques
- Analyze water and soil samples for pollutants using standard laboratory techniques

5. Course Content in Outline Form. [Be as brief as possible, but use as much space as necessary]

I. Introduction to Environmental Chemistry

A. The hydrosphere

B. The geosphere

C. Chemical Fate and Transport of substances

D. Cycles of Matter

II. Toxic Organic Compounds

A. Pesticides

B. Dioxins, Furans, and PCBs

C. Other Toxic Organic Compounds

III. Water Chemistry and Water Pollution

A. Redox, Acid/Base, and Ions in Natural Waters

B. Water Pollution and Treatment

IV. Toxic Heavy Metals

V. Hazardous Waste

VI. Soil and Agricultural Chemistry

VII. Aquatic Microbial Biochemistry

VII. Environmental Toxicology

Does this course content overlap with a course offered in your academic program? **Yes** X **No** ☐
If YES, what course(s) and provide a justification of the overlap. If this course is approved, we will modify CHEM 301 to make it specific to the atmosphere, climate change, and energy.

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.

6. 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).
List each cross-listed prefix for the course: ☐

B. Program responsible for staffing: ☐

7. References. [Provide 3 - 5 references]

Baird, C. and Cann, M. Environmental Chemistry 4th Ed, W.H. Freeman and Company (2008)
Manahan, S.E. Environmental Chemistry 8th Ed, CRC Press (2005)
Boehnke, D.N. and Del Delumyea, R. Laboratory Experiments in Environmental Chemistry Prentice Hall (2000)

8. Tenure Track Faculty Qualified to Teach This Course.

☐ Simone Aloisio, Blake Gillespie, Phil Hampton

9. Requested Effective Date:

First semester offered: Spring 2010

10. New Resources 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 (please refer to Dean's Office for additional processing) **Yes** X **No** ☐

E. Other
☐

11. Will this new course alter any degree, credential, certificate, or minor in your program? **Yes** X **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**, of preceding year.

Last day to submit forms to be considered during the current academic year: **April 15th**.

Simone Aloisio
Blake Gillespie

10/8/2008

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

Date

Approval Sheet

Program/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 International Affairs Director		
	Signature	Date
Center for Integrative Studies Director		
	Signature	Date
Center for Multicultural Engagement Director		
	Signature	Date
Center for Civic Engagement Director		
	Signature	Date
Curriculum Chair		
	Signature	Date
Dean of Faculty		
	Signature	Date