CGS Agenda Item: 11-45
Effective: Spring 2012

Eastern Illinois University

REVISED COURSE PROPOSAL FORMAT

Please check one: ☐ New course **X** Revised course

PART I: CATALOG DESCRIPTION

1. **Course prefix and number, such as ART 1000:** Gel 4850 (formerly 4335)
2. **Title (may not exceed 30 characters, including spaces):** Environmental Geology
3. **Long title, if any (may not exceed 100 characters, including spaces):**
4. **Class hours per week, lab hours per week, and credit [e.g., (3-0-3)]:** (3-0-3)
5. **Term(s) to be offered:** ☐ Fall X Spring ☐ Summer ☐ On demand
6. **Initial term of offering:** ☐ Fall X Spring ☐ Summer **Year:** 2012

Course description (not to exceed four lines): Study of natural and engineered interactions of contaminants and the geologic environment. Topics include types and analysis of common contaminants, surface and groundwater quality, risk analysis, U.S. environmental law, industrial and municipal waste disposal, and remediation techniques.

7. **Registration restrictions:**

   a. **Identify any equivalent courses** (e.g., cross-listed course, non-honors version of an honors course).

   b. **Prerequisite(s),** including required test scores, courses, grades in courses, and technical skills. Indicate whether any prerequisite course(s) MAY be taken concurrently with the proposed/revised course.
   Chm 1410, Mat 1330 and (Gel 1300G or permission of instructor)

   c. **Who can waive the prerequisite(s)?**

   ☐ No one X Chair X Instructor ☐ Advisor ☐ Other (Please specify)

   d. **Co-requisites** (course(s) which MUST be taken concurrently with this one):

   e. **Repeat status:** X Course may not be repeated.

   ☐ Course may be repeated to a maximum of hours or times.

   f. **Degree, college, major(s), level, or class** to which registration in the course is restricted, if any:

   g. **Degree, college, major(s), level, or class** to be excluded from the course, if any:

8. **Special course attributes** [cultural diversity, general education (indicate component), honors, remedial, writing centered or writing intensive]

9. Grading methods (check all that apply): X Standard letter ☐ C/NC ☐ Audit ☐ ABC/NC ("Standard letter"—i.e., ABCDF--is assumed to be the default grading method unless the course description indicates otherwise.)

10. Instructional delivery method: X lecture ☐ lab ☐ lecture/lab combined ☐ independent study/research ☐ internship ☐ performance ☐ practicum or clinical ☐ study abroad ☐ other

PART II: ASSURANCE OF STUDENT LEARNING

1. List the student learning objectives of this course:

a. If this is a general education course, indicate which objectives are designed to help students achieve one or more of the following goals of general education and university-wide assessment:

- **EIU graduates will write and speak effectively.**
- **EIU graduates will think critically.**
- **EIU graduates will function as responsible citizens.**

Student will:

1. describe current problems and processes of waste management, pollution prevention, and remediation (critical thinking)
2. use mathematics, chemistry and physics principles to analyze water and contaminant flow, common environmental chemical reactions, and risk to human communities from common contaminants (critical thinking)
3. describe current U.S. law as it applies to environmental problems (critical thinking, responsible citizens)
4. present orally and discuss a case study of an environmental problem (critical thinking, effective speaking)

b. If this is a graduate-level course, indicate which objectives are designed to help students achieve established goals for learning at the graduate level:

- **Depth of content knowledge**
- **Effective critical thinking and problem solving**
- **Effective oral and written communication**
- **Advanced scholarship through research or creative activity**

Graduate student will:

1. Perform independent research on a problem in environmental engineering and write paper describing solution (problem solving, critical thinking, depth of content knowledge, effective written communication, and advanced scholarship)

2. Identify the assignments/activities the instructor will use to determine how well students attained the learning objectives:

Undergraduate credit:

Exams 80%

Class assignments and oral presentation 20%

Graduate credit:
Exams 50%
Class assignments and oral presentation 20%
Research paper (graduate only) 30%

3. Explain how the instructor will determine students' grades for the course:

Learning Objectives)	**Assignments and Oral Presentation**	**Exams**	**Research Paper, Graduate Only**
describe current problems and processes of waste management, pollution prevention, and remediation (critical thinking)		X	X
use mathematics, chemistry and physics principles to analyze water and contaminant flow, common environmental chemical reactions, and risk to human communities from common contaminants (critical thinking)	X	X	
describe current U.S. law as it applies to environmental problems (critical thinking)		X	X
present orally and discuss a case study of an environmental problem (critical thinking, effective speaking)	X		
perform independent research on a problem in environmental engineering and write paper describing solution (problem solving, critical thinking, depth of content knowledge, effective written communication, and advanced scholarship)			X

4. For technology-delivered and other nontraditional-delivered courses/sections, address the following:

a. Describe how the format/technology will be used to support and assess students' achievement of the specified learning objectives:

b. Describe how the integrity of student work will be assured:

c. Describe provisions for and requirements of instructor-student and student-student interaction, including the kinds of technologies that will be used to support the interaction (e.g., e-mail, web-based discussions, computer conferences, etc.):

5. For courses numbered 4750-4999, specify additional or more stringent requirements for students enrolling for graduate credit. These include:

a. course objectives;

b. projects that require application and analysis of the course content; and separate methods of evaluation for undergraduate and graduate students.

Graduate students will have the same learning objectives but will demonstrate advanced scholarship by applying their understanding to research of a current problem related to environmental engineering. They will complete a literature review on the research problem, make local site visits (if possible) to survey physical aspects of this problem and interview professionals involved with this problem (if applicable). They will produce a presentation and a written analysis of their findings.

6. If applicable, indicate whether this course is writing-active, writing-intensive, or writing-centered, and describe how the course satisfies the criteria for the type of writing course identified. (See Appendix *.)

PART III: OUTLINE OF THE COURSE

Provide a week-by-week outline of the course's content. Specify units of time (e.g., for a 3-0-3 course, 45 fifty-minute class periods over 15 weeks) for each major topic in the outline. Provide clear and sufficient details about content and procedures so that possible questions of overlap with other courses can be addressed. For technology-delivered or other nontraditional-delivered courses/sections, explain how the course content "units" are sufficiently equivalent to the traditional on-campus semester hour units of time described above.

Class will meet 3 times each week for 15 weeks.

1. Streams, Lakes and Pollutants (8 hours)
    a) concentrations of liquids and gases
    b) Ideal Gas Law
    c) hydrologic cycle
    d) stream behavior
    e) Conservation of Mass
        (i) Steady state, conservative flow
        (ii) Steady state, non-conservative flow
        (iii) Transient flow
2. Low Temperature Aqueous Geochemistry (7 hours)
    a) stoichiometry and equilibrium
    b) oxygen demand
    c) acid/base reactions
    d) natural chemical cycles
    e) solubility
    f) organic chemistry - names and structure

g) radiochemistry

Exam

3. Assessing Risk to Humans and the Environment (3 hours)
    a) risk analysis
    b) risk perception
    c) hazard identification
    d) dose-response and exposure assessment
    e) risk characterization
4. Surface Water Quality (6 hours)
    (a) families of pollution
    (b) U.S. water quality laws
    (c) water supply
    (d) water quality in streams
    (e) water quality in lakes

Exam

5. Groundwater Quality (6 hours)
    a) characterization of groundwater aquifers
        i. Darcy's Law, hydraulic gradient, discharge, velocity
    b) contaminant transport
    c) remediation of groundwater systems
6. Sustainability – non-hazardous materials (5 hours)
    a) drinking water treatment
    b) sewage treatment
    c) municipal solid waste treatment
        i. landfill design
        ii. other disposal methods

Exam

7. Sustainability – hazardous materials(3 hours)
    (a) hazardous waste disposal
    (b) hazardous material laws
    (c) radioactive waste
    (d) mining waste

Oral Presentations (3 hours)

8. Resource Recovery (1 hour)
    (a) Recycling philosophy

(b) Recycling procedures

Final Exam

PART IV: PURPOSE AND NEED

1. Explain the department's rationale for developing and proposing the course.

a. If this is a general education course, you also must indicate the segment of the general education program into which it will be placed, and describe how the course meets the requirements of that segment.

b. If the course or some sections of the course may be technology delivered, explain why.

2. Justify the level of the course and any course prerequisites, co-requisites, or registration restrictions.

This course requires algebra skills and a basic knowledge of chemical analysis acquired by students in earlier, prerequisite courses. Basic geology knowledge is helpful but not necessary to success in this course. The critical thinking skills used in this class are at a high level and thus this course is a senior level or graduate level course.

3. If the course is similar to an existing course or courses, justify its development and offering.

a. If the contents substantially duplicate those of an existing course, the new proposal should be discussed with the appropriate chairpersons, deans, or curriculum committees and their responses noted in the proposal.
This course is a revision of a previously existing course, GEL 4335. It does not duplicate other courses in the Department of Geology/Geography, the Department of Physics, or the Department of Biological Sciences.

b. Cite course(s) to be deleted if the new course is approved. If no deletions are planned, note the exceptional need to be met or the curricular gap to be filled.

4. Impact on Program(s):

a. For undergraduate programs, specify whether this course will be required for a major or minor or used as an approved elective.
This course is a required course for the geology major. One third of geology majors enter the environmental field. This course covers material related to contamination of the solid and liquid parts of the earth including prevention, remediation, and effects of that contamination.

It is an elective course for Physics majors, Radiation Physics Option. This course is an elective for the Environmental Biology major.

b. For graduate programs, specify whether this course will be a core requirement for all candidates in a degree or certificate program or an approved elective.

This course may be an elective for biological science graduate students.

If the proposed course changes a major, minor, or certificate program in or outside of the department, you must submit a separate proposal requesting that change along with the course proposal. Provide a copy of the existing program in the current catalog with the requested changes noted.

PART V: IMPLEMENTATION

1. **Faculty member(s) to whom the course may be assigned:** Kathleen M. Bower or other qualified faculty of the Geology Program.

   If this is a graduate course and the department does not currently offer a graduate program, it must document that it employs faculty qualified to teach graduate courses.

2. **Additional costs to students:**

   Include those for supplemental packets, hardware/software, or any other additional instructional, technical, or technological requirements. (Course fees must be approved by the President's Council.)

3. **Text and supplementary materials to be used (Include publication dates):**

G.M. Masters and W.P. Ela, Introduction to Environmental Engineering and Science, 3rd edition, 2008

PART VI: COMMUNITY COLLEGE TRANSFER

If the proposed course is a 1000- or 2000-level course, state either, "A community college course may be judged equivalent to this course" OR "A community college course will not be judged equivalent to this course." A community college course will not be judged equivalent to a 3000- or 4000-level course but may be accepted as a substitute; however, upper-division credit will not be awarded.

PART VII: APPROVALS

Date approved by the department or school: September 23, 2011

Date approved by the college curriculum committee: September 30, 2011

Date approved by the Honors Council ***(if this is an honors course):***

Date approved by CAA: CGS:

*In **writing-active courses**, frequent, brief writing activities and assignments are required. Such activities -- some of which are to be graded – might include five-minute in-class writing assignments, journal keeping, lab reports, essay examinations, short papers, longer papers, or a variety of other writing-to-learn activities of the instructor's invention. Writing assignments and activities in writing-active courses are designed primarily to assist students in mastering course content, secondarily to strengthen students' writing skills. In **writing-intensive courses**, several writing assignments and writing activities are required. These assignments and activities, which are to be spread over the course of the semester, serve the dual purpose of strengthening writing skills and deepening understanding of course content. At least one writing assignment is to be revised by the student after it has been read and commented on by the instructor. In writing-intensive courses, students' writing should constitute no less than 35% of the final course grade. In **writing-centered courses** (English 1001G, English 1002G, and their honors equivalents), students learn the principles and the process of writing in all of its stages, from inception to completion. The quality of students' writing is the principal determinant of the course grade. The minimum writing requirement is 20 pages (5,000 words).

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