08-7u.

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:	Senate Action Date:
		07-43u	App - 9/30/08	App - 2/24/09

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person	Email Address
Jonathan Lewis	**jclewis@iup.edu**
Proposing Department/Unit	Phone
Geoscience	**724-357-5624**

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply)

_____New Course _____Course Prefix Change _____Course Deletion

_X_Course Revision _____Course Number and/or Title Change _X_Catalog Description Change

***Current* Course prefix, number and full title**	***Proposed* course prefix, number and full title, if changing**
GEOS 310 Environmental Geology	

2. Additional Course Designations: check if appropriate

_____ This course is also proposed as a Liberal Studies Course.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____Catalog Description Change _____Program Revision

_____New Degree Program _____Program Title Change _____Other

_____New Minor Program _____New Track

***Current* program name**	***Proposed* program name, if changing**

4. Approvals

		Date
Department Curriculum Committee Chair(s)		2/4/08
Department Chair(s)		2/4/08
College Curriculum Committee Chair		2-11-08
College Dean		2-11-08
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)		
UWUCC Co-Chairs	Gail Sechrist	9/30/08

* where applicable

Received SEP 25 2008 Liberal Studies

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PART II: Description of Curricular Change

1. New Syllabus of Record

I. Catalog Description

GEOS 310 Environmental Geology **3c-3l-4cr**
Prerequisite: Grade of C or better in GEOS 202 and GEOS 203

The study of human interactions with the Earth from a geological perspective. Emphasis is placed on the scientific concepts necessary to understand these interactions, including groundwater flow, soil formation and destruction, waste disposal, geologic hazards, stream hydrology, climate change, and natural resources. Contemporary environmental issues are explored through primary scientific literature and news media. Includes field trips which may occur on weekends.

II. Course Objectives

At the end of this course, students will be able to:

- determine the configuration of a water table aquifer on the basis of head data.
- summarize and evaluate the interactions between surface water and ground water in both confined and unconfined aquifers.
- recognize and evaluate the major types of threats associated with volcanism and seismicity.
- explain how crustal surface velocities relate to volcanic hazards, and to seismic hazards at plate boundaries.
- summarize the mechanisms of desert formation, the controls on glaciation, and the greenhouse effect.
- perform vector decomposition and explain its importance in understanding mass wasting.
- summarize fundamental concepts of power generation and waste disposal.

III. Course Outline

<u>Lecture</u>

Part A (13 academic hours): Tectonic Framework And Geologic Hazards

1. Earth's crust
2. Tectonic environments
3. Volcanoes
4. Earthquakes
5. Streams and floods
6. Mass Wasting

Part B (13 academic hours): The Hydrosphere and Atmosphere

1. Coastal processes
2. Water resources
3. Water pollution
4. Air pollution
5. Desert and glacial environments
6. Climate change

Exam 1 (1 academic hour)

Part C (6 academic hours): Earth Resources

1. Rocks and minerals

2. Soils
3. Fossil fuels
4. Alternative energy sources

Part D (4 academic hours): Waste Disposal

1. Solid and liquid waste
2. Radioactive waste

Part E (5 academic hours): Environmental Policy

1. Environmental law
2. Land-use planning
3. Engineering geology

Final Exam (during final exam period)

Laboratory Exercises (3 academic hours each)

Week 1:	Plate motions
Week 2:	Seismic hazards
Week 3:	Streams and floods
Week 4:	Mass wasting
Week 5:	Groundwater
Week 6:	Laboratory midterm exam
Week 7:	Climate change
Week 8:	Water pollution
Week 9:	Wastewater treatment
Week 10:	Hazardous waste
Week 11:	Power generation
Week 12:	Selenium contamination case study
Week 13:	Acid mine drainage
Week 14:	Laboratory final exam

IV. Evaluation Methods

Each component of the course will contribute to the final grade as follows:

Lecture quizzes	20%
Lecture exam 1	20%
Lecture final exam	20%
Laboratory exercises	20%
Laboratory final exam	20%

V. Example Grade Scale:

Final grades will be assigned based on the following scale: 90-100%=A; 80-89%=B; 70-79%=C; 60-69%=D, and <60%=F.

VI. Attendance Policy

The attendance policy will conform to IUP's undergraduate course attendance policy.

VII. Required Textbook(s), Supplemental Books and Readings

The required textbook for this course is:

Montgomery, Carla W. *Environmental Geology 7th edition*. New York: McGraw Hill, 2006.

The required laboratory manual for this course is :

Freeman, Tom. *Environmental Geology Laboratory*. New York: John Wiley & Sons, Inc., 2004

VIII. Special Resource Requirements

Students will be required to have the following resources:

Geologic Field Notebook, protractor and ruler.

IX. Bibliography

Keller, E. A., Introduction to Environmental Geology, 3rd Edition, 2005, (Pearson Education, Inc.)

Pipkin, B. W., D. D. Trent, and Richard Hazlett, 2005, Geology and the Environment, 4th Edition (Brooks/Cole Publishing)

Online Resources:

http://serc.carleton.edu/NAGTWorkshops/climatechange/index.html (topic: climate change)

http://serc.carleton.edu/NAGTWorkshops/health/index.html (topic: geology & human health)

http://www.nagt.org/nagt/jge/index.html (topic: access to the Journal of Geoscience Education)

2. Summary of the Proposed Revisions

The proposed revisions include:

a) changing the credit distribution from 2c-3l-3cr to 3c-3l-4cr, and

b) changing the prerequisite from GEOS 131/132 or instructor permission to Grade of C or better in GEOS 202 and GEOS 203.

3. Justification/Rationale for the Revision

The content within the discipline of Environmental Geology has expanded recently largely in response to two developments. First, the content related to geologic hazards has grown because of the rapid development of Global Positioning System capabilities and satellite image analysis tools. As such, the means by which these methods are used to address seismic and volcanic hazards is an important addition to this course. Second, the recognition of coupling between Earth's systems, for example between the atmosphere and hydrosphere or between the hydrosphere and lithosphere, has had a profound impact on our understanding of many contemporary environmental issues. To maintain a modern curriculum, we are required to add subject material and consequently classroom hours distributed across the wide range of topics covered in this course.

The revised version of GEOS 310 will be comparable to Environmental Geology courses taught elsewhere, as indicated by the following list of courses that are likewise offered at 4 credits:

University of Illinois at Chicago, EAES 285 – Environmental Geology
University of Illinois at Urbana-Champaign, GEOL 380 – Environmental Geology

4. Old Syllabus of Record

There is no syllabus of record; the following is a 1993 syllabus of instruction.

GS 310 Environmental Geology
Fall 1993

Joseph C. Clark	Lecture: TR 1:15-2:15
117 Walsh Hall	Lab: R 2:15-5:15
Phone: 357-2379	Lecture: Walsh 104
Office Hours: T 9:15-11:45	Lab: Walsh 106

Texts:

Keller, E.A., 1992, Environmental Geology, 6th ed.
Wilshusen, J.P., 1979, Geologic Hazards in Pennsylvania

Course Outline: attached

Course Assessment:

A mid-term exam and the final exam, which consist of short essay-type questions, will constitute 50% of the grade. There are no unannounced quizzes.

Laboratory exercises, including field trip reports, will make up 30% of the grade. For some exercises you will have one week, for others two weeks. Exercises are not acceptable after graded reports are returned. There are no make-up field trips.

An independent project (see posted examples) with a written abstract and an oral presentation will comprise 20% of the grade.

Environmental Geology

I. Introduction: background (Ch. 1,2,3)
II. Erosion of the land (Ch. 4)
    A. Rates
    B. Man's effect
III. Chemical weathering (Ch. 16)
    A. Reactions: carbonates, silicates
    B. Rates
IV. Landslides (Ch. 5 & 7)
    A. Classification
    B. Causes: natural factors, manmade factors
    C. Prediction: susceptibility maps
    D. Control
        1. Japanese work
        2. Portuguese Bend landslide, CA
V. Earthquakes (Ch. 8)
    A. Effects: San Francisco, 1906
        San Fernando Valley, 1971
        Loma Prieta, 1989
    B. Scales of measurement
    C. Relationship to faulting (1874)
        1. elastic rebound theory (H.F. Reid, 1911)
        2. types defined
        3. evidence

4. active
D. Case Study: Davenport Nuclear Reactor Site
E. USGS San Andreas fault program
F. Prediction
G. Control
H. Until Prediction & Control

VI. Hydrologic Cycle (Ch. 11)
A. Man's effect
B. Man's utilization

VII. Acid mine drainage
A. Problems
B. Regulations & control
C. Land reclamation
D. Coal economics

VIII. Groundwater (Ch. 11)
A. Porosity; permeability
B. Flow of fluids; Darcy's Law
C. Wells

IX. Subsidence (136-142)
A. Natural causes; karst
B. Manmade causes
C. Possible controls; cost

X. Gas Well Drilling & Production (Ch. 14 & 15)
A. Environmental problems
B. Brine
1. origin & problems
2. DER guidelines
3. Barium problems; USPHS Drinking Water Standards

XI. Evaluation of Coal vs. Gas Well Contamination

XII. Waste Management (Ch. 12)

XIII. Coastal Hazards (Ch. 10)
A. Seacliff & beach erosion
1. causes, rates, engineering
2. examples: Santa Cruz jetties
Santa Barbara breakwater
Bolinas, CA seacliff retreat
B. Tropical cyclones (hurricanes)
C. Tsunami (seismic sea waves)

XIV. Volcanic Hazards (Ch. 9)

XV. Geologic Aspects of Environmental Health (Ch. 13)

XVI. Environmental Law (Ch. 18)

XVII. Review

5. Liberal Studies checklist: Not applicable.

Part III. Letters of Support or Acknowledgment

No other departments or programs are affected by this change.