

LSC Use Only Proposal No:
LSC Action-Date:

UWUCC Use Only Proposal No: 12-99
UWUCC Action-Date: App 3/12/13

Senate Action Date: App-3/26/13

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

| | |
|--------------------------------------|------------------------------|
| Contact Person(s) Kenneth S. Coles | Email Address kcoles@iup.edu |
| Proposing Department/Unit Geoscience | Phone 7-2379 |

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

1. Course Proposals (check all that apply)

| | | |
|--|--|---|
| <input checked="" type="checkbox"/> New Course | <input type="checkbox"/> Course Prefix Change | <input type="checkbox"/> Course Deletion |
| <input type="checkbox"/> Course Revision | <input type="checkbox"/> Course Number and/or Title Change | <input type="checkbox"/> Catalog Description Change |

Current course prefix, number and full title:

Proposed course prefix, number and full title, if changing: GEOS 356 Coastal Processes and Geology

2. Liberal Studies Course Designations, as appropriate

This course is also proposed as a Liberal Studies Course (please mark the appropriate categories below)

| | | | |
|--|---|---|---|
| <input type="checkbox"/> Learning Skills | <input type="checkbox"/> Knowledge Area | <input type="checkbox"/> Global and Multicultural Awareness | <input type="checkbox"/> Writing Across the Curriculum (W Course) |
| <input type="checkbox"/> Liberal Studies Elective (please mark the designation(s) that applies – must meet at least one) | | | |
| <input type="checkbox"/> Global Citizenship | <input type="checkbox"/> Information Literacy | <input type="checkbox"/> Oral Communication | |
| <input type="checkbox"/> Quantitative Reasoning | <input type="checkbox"/> Scientific Literacy | <input type="checkbox"/> Technological Literacy | |

3. Other Designations, as appropriate

| | |
|--|---|
| <input type="checkbox"/> Honors College Course | <input type="checkbox"/> Other: (e.g. Women's Studies, Pan African) |
|--|---|

4. Program Proposals

| | | | |
|---|--|--|------------------------------------|
| <input type="checkbox"/> Catalog Description Change | <input type="checkbox"/> Program Revision | <input type="checkbox"/> Program Title Change | <input type="checkbox"/> New Track |
| <input type="checkbox"/> New Degree Program | <input type="checkbox"/> New Minor Program | <input type="checkbox"/> Liberal Studies Requirement Changes | <input type="checkbox"/> Other |

Current program name:

Proposed program name, if changing:

5. Approvals

| | Signature | Date |
|--|------------------|--------------|
| Department Curriculum Committee Chair(s) | Kenneth S. Coles | Feb 12, 2013 |
| Department Chairperson(s) | Sam V. H. | 2/13/13 |
| College Curriculum Committee Chair | Anne Kamb | 3/5/13 |
| College Dean | Dean Ryf | 3/5/13 |
| Director of Liberal Studies (as needed) | | |
| Director of Honors College (as needed) | | |
| Provost (as needed) | | |
| Additional signature (with title) as appropriate | | |
| UWUCC Co-Chairs | Gail Schust | 3/12/13 |

Received

MAR 6 2013

Liberal Studies

Part II. Description of Curricular Change

1. SYLLABUS OF RECORD

I. Catalog Description

GEOS 356 Coastal Processes and Geology

(3c-3l-4cr)

Prerequisite: GEOS 203, Geoscience majors and minors, and Earth and Space Science Education majors/minors, or permission of instructor.

The study of the origin and evolution of coastal environments from a geological perspective.

Emphasis is placed on the quantitative investigation of the dominant processes (waves, tides and currents) that create and modify these environments, as well as the role of human-induced change. Contemporary issues in coastal geology are explored through primary scientific literature, news media and laboratory exercises. Includes field trips that may occur on weekends.

II. Course Objectives

Course Outcomes

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

- Quantitatively analyze, on multiple time scales, the physical processes that occur in the coastal environment with an emphasis on those that control sediment movement and changes in morphology.
- Predict the type of coastal environment based on their understanding of tides, waves, and storm-controlled processes for a particular location.
- Synthesize knowledge gained in this class, in other courses, and from the internet and primary literature sources to predict the response of coastal systems to natural and human-induced changes.
- Evaluate the geologic processes that play a role in current issues facing the coastal environment, including critiquing popular news media reports.
- Plan a research project that will assess the dominant processes controlling the morphology of a coastal location on both short and long timescales, and present the geologic evidence to support their conclusions.

III. Course Outline

- | | |
|--|----------|
| 1. Humans and the Coastal Zone | 2 hours |
| 2. Plate Tectonics and Coastal Morphology | 2 hours |
| 3. Global and Local Sealevel Change | 3 hours |
| a. Ancient | |
| b. Future | |
| 4. Coastal Processes | 8 hours |
| a. Storms (short term – large scale changes) | |
| b. Wave Dynamics (erosion and sediment transport) | |
| c. Tides and tidal currents (erosion and sediment transport) | |
| d. Sediment Transport | |
| 5. Exam #1 | 1 hour |
| 6. Coastal Environments | 13 hours |
| a. Beach and Nearshore | |

- b. Barrier Islands
 - c. Tidal Inlets
 - d. Coastal Sand Dunes
 - e. Rocky Shorelines
 - f. Carbonate Shorelines
 - g. River Deltas
 - h. Estuaries
7. Exam #2 1 hour
8. Human influences and environmental Issues 12 hours
- a. Shoreline change
 - b. Engineering the coast
 - c. Beach renourishment
 - d. Coastal management issues
 - e. Climate change
9. Final Exam during final exam period 2 hours

Laboratory Exercises (3 academic hours each)

- Week 1: Classification of Coastlines
- Week 2: Sea Level
- Week 3: Waves
- Week 4: Tides
- Week 5: Sediment Budgets (field trip)
- Week 6: Beach Cycles (field trip)
- Week 7: Barrier Island Migration (field trip)
- Week 8: Carbonate Shorelines
- Week 9: River Deltas
- Week 10: Estuaries
- Week 11: Case Study: Coastal Engineering
- Week 12: Case Study: Climate Change
- Week 13: Case Study: Oil Spill
- Week 14: Student Research Presentations

IV. Evaluation Methods

Each component of the course will contribute to final grade according to:

Laboratory Exercises and Field Trips (40%): Weekly laboratory exercises and field trips will bring a hands-on student centered focus to applying the material learned in lecture.

Exams: 2 exams during semester (15% each) and the final exam (20%) will cover material from both lecture and lab.

Research Project (10%): A group research project will include a written and oral portion. It will focus on formulating a research question, evaluating their research question through data collection and the presentation of their findings.

V. Example Grading Scale

The final grade for this course will be determined using the following schedule:

A=90-100%; B=80-89%, C=70-79%, D=60-69%, F=<60%

VI. Attendance Policy

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

VII. Required textbooks, supplemental books and readings

Required Textbook : Davis, Richard and Fitzgerald, Duncan, 2004, *Beaches and Coasts*, Wiley-Blackwell.

Supplemental Readings:

Coe, Angela et al., 2003, *The Sedimentary Record of Sea-Level Change*. Cambridge University Press.

Farnsworth, Katherine and Warrick, Jon, 2007, *Sources, Dispersal and Fate of Fine Sediment Supplied to Coastal California*. USGS Scientific Investigations Report 2007-5254.

Open University Course Team, 1989, *Waves, Tides and Shallow-water Processes*. The Open University.

Pilkey, Orrih and Young, Rob, 2009, *The Rising Sea*. Shearwater.

Valiela, Ivan, , 2006, *Global Coastal Change*. Blackwell Publishing.

2 additional primary literature journal articles of the students choice from the previous 5 years.

VIII. Special resource requirements

There are no special resource requirements for this course.

IX. Bibliography

In addition to the required textbooks and supplemental readings from science journals, the following will be used to develop the course curriculum:

Bird, Eric, 2008, *Coastal Geomorphology: An Introduction*. Jon Wiley and Sons.

Dean, Cornelia, 2001, *Against the Tide*. Columbia University Press.

Dean, Robert and Dalrymple, Robert, 1991, *Water Wave Mechanics for Engineers and Scientists*. World Scientific Publication Co.

Dean, Robert and Dalrymple, Robert, 2004, *Coastal Processes with Engineering Applications*. Cambridge University Press.

Griggs, Gary et al., 2005, *Living with the Changing California Coast*. University of California Press.

Kennett, James, 1981, *Marine Geology*. Prentice Hall.

Komar, Paul, 1998, *Beach Processes and Sedimentation*. Prentice Hall.

Masselink, Gerd et al. *Coastal Processes and Geomorphology*. Routledge. 2011

Milliman, John and Farnsworth, Katherine, 2011, *River Discharge to the Coastal Ocean*. Cambridge University Press.

Nittrouer, Charles et al., 2007, *Continental Margin Sedimentation*. Blackwell Publishing.

Southard, John, 2007, *12.110 Sedimentary Geology, Spring 2007*. MIT OpenCourseWare, <http://ocw.mit.edu> (accessed 06 Sep 2010) License: Creative Commons BY-NC-SA.

Woodroffe, Colin, 2002, *Coasts*. Cambridge University Press.

Course Analysis Questionnaire

Section A: Details of the Course

A1. How does this course fit into the programs of the department? For which students is the course designed? Explain why this content cannot be incorporated into an existing course.

This course is designed as a controlled elective class for B.S. Geology (any track) and Earth and Space Science Education majors and Geology minors. The content cannot be incorporated into an existing course as it integrates introductory elements from a number of sub-disciplines within the Geosciences focused on the coastal environment.

A2. Does this course require changes in the content of existing courses or requirements for a program?

No. This course will not require any changes in existing courses or the program.

A3. Has this course ever been offered at IUP on a trial basis?

This course was offered as a GEOS 481 topics course in Spring 2009. The proposed course number has been checked against the list of unavailable course numbers.

A4. Is this course to be a dual-level course?

This course is not a dual-level course.

A5. If this course may be taken for variable credit, what criteria will be used to relate the credits to the learning experience of each student?

This course cannot be taken for variable credit.

A6. Do other higher education institutions currently offer this course? If so, please list examples.

Yes.

- Oberlin College, GEOL 250: Beaches and Coasts
- College of Charleston, EVSS 645: Coastal Processes and Issues
- Hunter College, CUNY, GEOL 334: Coastal Geomorphology
- UC Davis, HYD 256: Geomorphology of Estuaries and Deltas

A7. Is the content, or are the skills, of the proposed course recommended or required by a professional society, accrediting authority, law or other external agency?

No.

Section B: Interdisciplinary Implications

B1. Will this course be taught by instructors from more than one department?

No.

B2. What is the relationship between the content of this course and the content of courses offered by other departments?

There is no overlap with this course and those offered by other departments.

B3. Will this course be cross-listed with other departments?

No.

B4. Will seats in this course be made available to students in the School of Continuing Education?

No.

Section C: Implementation

C1. Are faculty resources adequate?

Faculty resources are currently adequate to teach this course. This course will be counted as one preparation and six hours of equated workload.

C2. What other resources will be needed to teach this course and how adequate are the current resources?

The lab materials are already available here in the department, or available free online. No other resources will be needed. Fieldwork can be accomplished using the vans and camping gear already available within the department.

C3. Are any of the resources for this course funded by a grant?

No.

C4. How frequently do you expect this course to be offered?

Once every two years.

C5. How many sections of this course do you anticipate offering in any single semester?

One.

C6. How many students do you plan to accommodate in a section of this course? What is the justification for this planned number of students?

The lecture and laboratory for this course will be integrated and our laboratory facilities accommodate 24 students, therefore, 24 will be the maximum number of students per section.

C7. Does any professional society recommend enrollment limits or parameters for a course of this nature?

No.

C8. If this course is a distance education course, see the Implementation of Distance Education Agreement and the Undergraduate Distance Education Review Form in Appendix D and respond to the questions listed.

NOT APPLICABLE

Section D: Miscellaneous

None

Part III. Letters of Support or Acknowledgment

None