LSC Use Only Proposal No: LSC Action-Date:	*UWUCC Use Only* Proposal No: 14-97e UWUCC Action-Date: App 10/28/14 Senate Action Date: App 12/2/14

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person(s) **Karen Rose Cercone**	Email Address **kcercone@iup.edu**
Proposing Department/Unit **Geoscience**	Phone **724-357- 7650**

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)

_____ 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: ***GEOS 354 Geomorphology***

Proposed course prefix, number and full title, if changing:

2. Liberal Studies Course Designations, as appropriate

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

_____ Learning Skills _____ Knowledge Area ____ Global and Multicultural Awareness _____ Writing Intensive (include W cover sheet)

_____ Liberal Studies Elective (please mark the designation(s) that applies – must meet at least one)

_____ Global Citizenship _____ Information Literacy _____ Oral Communication

_____ Quantitative Reasoning _____ Scientific Literacy _____ Technological Literacy

3. Other Designations, as appropriate

_____ Honors College Course _____ Other: (e.g. Women's Studies, Pan African)

4. Program Proposals

_____ Catalog Description Change _____ Program Revision _____ Program Title Change _____ New Track

_____ New Degree Program _____ New Minor Program _____ Liberal Studies Requirement Changes _____ Other

Current program name:

Proposed program name, if changing:

5. Approvals	**Signature**	**Date**
Department Curriculum Committee Chair(s)	Kenneth S. Cole	4/17/2014
Department Chairperson(s)		4/24/14
College Curriculum Committee Chair		10/17/14
College Dean		10/20/14
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 S Sedivist	10/28/14

Part II. Description of Curricular Change

1. SYLLABUS OF RECORD

I. Catalog Description

GEOS 354 Geomorphology (3c-3l-4cr)
Prerequisite: Grade of C or better in GEOS 202 and 203

Study of the origin of the Earth's landforms, including relationship of geologic structure to landform types and the role of geomorphic processes in landscape development.

II. Course Objectives

1. Students will describe how the Earth's landforms relate to fundamental geologic processes such as river flow, erosion, glaciations, and tectonic uplift.
2. Students will determine the relative ages of landscape features and calculate the rates at which landscape features change through time.
3. Students will investigate how different types of bedrock, topography and plate activity affect the development of unique landscapes around the world.
4. Students will apply computer-based Geographic Information System software to solve laboratory and field problems of landscape classification and analysis.
5. Students will explore the connections between human activity and landscape evolution, both over the long scale of historic time and in the present-day context of development and natural disasters.

III. Course Outline

Lecture Schedule

A. What is process geomorphology? (5 hours)
Evolution of landforms, equilibrium versus disturbances, internal and external forcing factors

B. Establishing timing in the landscape (3 hours)
Paradigms of landscape change: uniformity, catastrophism and cycles. Methods of age-dating and changes in landscape evolution through time.

C. Fluvial geomorphology (8 hours)
Classifying rivers and streams, predicting river behavior and floods, measuring discharge and other parameters, hydrographs and floods, river slope, sinuosity and reach.

D. Coastal Geomorphology (6 hours)
Classifying coastlines, landforms and behavior, sea level change and coastline migration.

E. Karst Landscapes (4 hours)
Dissolution of bedrock and karst development. Climate control on karst topography.

F. Glacial Geomorphology (3 hours)
Glacial erosion and alpine topography. Glacial deposition and impact of ice sheets

G. Hillslope and Tectonic Geomorphology (6 hours)

Impact of tectonic uplift and steepening. Mass movement and related landforms.

H. Eolian processes (3 hours)

Wind erosion and desert landforms. Eolian deposition and dune migration. Desertification.

I. Human Interaction with the Landscape (4 hours)

Impact of human activity on landform development (and vice versa), both in historic time and the present day. Over view of case study: California Coastal Zone.

J. Culminating Activity during final exam period: (2 hours)

Final Exam – includes both lecture and lab material.

Lab Schedule

Week 1	Geologic and topographic map review
Week 2	Introduction to geographic information systems and ArcGIS
Week 3	Estimating landscape ages
Week 4	Stream and river classification and analysis
Week 5	Field lab: measuring stream flow and discharge
Week 6	Stream project completion
Week 7	**Midterm Exam – includes both lecture and lab material**
Week 8	No formal lab – preparation for weekend field trip to Lake Erie
Week 9	No formal lab – clean-up of equipment after weekend field trip
Week 10	Pennsylvania glacial landforms
Week 11	Mass wasting
Week 12	Structural landforms
Week 13	Human interactions with the landscape
Week 14	Completion of case study: California Coastline

IV. Evaluation Methods

The final class grade will be determined from the following assessments:

Exams	40%
Quizzes	10%
Lab Assignments	25%
Problem Sets	15%
In-class Activities	10%
Total	100 %

V. Example Grading Scale

The final grade will be assigned using a scale no stricter than 90-100%=A; 80-89.9%=B; 70-79.9%=C; 60-69.9%=D and below 60%=F.

VI. Attendance Policy

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

VII. Required Textbook

Ritter, D.F., Kochel, R..C. and Miller, J.R., Process Geomorphology, Waveland Press, 2011. Supplemental readings for discussion will be assigned from geologic journals and news media.

VIII. Special Resource Requirements

Students must have a hand lens, sleeping bag, field boots and waterproof field notebook. Approximately $30 will be required for meals and camping during the 3-day field trip.

IX. Bibliography

In addition to the required textbook and supplemental readings from current literature, the following will be used to develop the course curriculum:

Anderson, Robert S. and Suzanne P. Anderson, Geomorphology: The Mechanics and Chemistry of Landscapes, 2010,Cambridge University Press.

Bierman, Paul R. and Davis R. Montgomery, Key Concepts in Geomorphology, 2013, Freeman.

Bird, Eric, Coastal Geomorphology: An Introduction (2nd edition), 2008, Wiley.

Burbank, Douglas W. and Anderson, Robert J., Tectonic Geomorphology (2nd edition), 2011, Wiley-Blackwell.

Charlton, Ro, Fundamentals of Fluvial Geomorphology, 2007, Routledge.

Dingman, S. Lawrence, Fluvial Hydraulics, 2009, Oxford University Press.

Harder, Christian, Tim Ormsby and Thomas Balstrom Understanding GIS: An ArcGIS Project Workbook, 2013, ESRI Press.

Higgett, Richard J., Fundamentals of Geomorphology (3rd edition), 2011, Routledge.

Leopold, Luna, M. Gorden Wolman and John P. Miller, Fluvial Processes in Geomorphology, 2012, Dover Publications.

Jackson, N. L., Nordstrom, K. F., Feagin, R. A., & Smith, W. K., 2013, Coastal geomorphology and restoration. *Geomorphology*, 199. (Edited volume from the 44th Annual Binghamton Geomorphology Symposium).

Johnson, Michael and Simon Harley, Orogenesis: The Making of Mountains, 2012, Cambridge University Press.

Masselink Gerd, Michael Hughes and Jasper Knight, Introduction to Coastal Processes and Geomorphology (2nd edition), 2011, Routledge.

McFee, John, The Control of Nature, 1990, Farrar, Straus and Giroux.

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

Price, Maribeth, Mastering ArcGIS, 2013, McGraw-Hill Science.

Stoffel, Markus, Stephen Rice, and Jens M. Turowski, "Process geomorphology and ecosystems: Disturbance regimes and interactions," 2013, *Geomorphology* 202 (Edited volume).

2. SUMMARY OF PROPOSED REVISIONS

Geomorphology is currently taught in a 2c-3l-3cr format. Material is presented in both lecture and laboratory formats. This proposed revision would add an additional lecture hour to promote better student learning outcomes primarily for department SLO goals II, III and IV (plate tectonic theory, spatial data analysis and map interpretation; computer spreadsheet analysis, statistics or mathematical modeling, and effective scientific communication skills). The new format for the class would then be 3c-3l-4cr, allowing for more classroom time for students to discuss and present their research proposal ideas. This change makes the class format similar to most other upper-level majors classes in the Geoscience Department.

3. JUSTIFICATION/RATIONALE FOR THE REVISION

This course revision addresses shortcomings that have been identified, in part, through our departmental Student Learning Outcomes committee. These shortcomings are addressed in the overarching curriculum proposal of which this revision is a part. The specific professional skills that this course revision aims to address are underlined below:

I. Students will develop the tools needed to analyze and solve problems in earth science.

II. Students will master three foundational content areas in geoscience: plate tectonic theory, organic evolution and environmental change.

III. Students will develop professional skills needed for field and lab research: rock & mineral identification and interpretation; spatial data analysis and map interpretation; computer spreadsheet analysis, statistics or mathematical modeling.

IV. Students will develop effective scientific communication skills in both written and oral formats.

Like its curricular equivalent in the new Geology track (GEOS 362 Plate Tectonics), Geomorphology holds a special place in the geosciences because it requires students to synthesize and apply concepts and principles from all branches of the field in order to analyze the development of landforms and landscape. Furthermore, this class uniquely lends itself to the learning and use of a critical tool in the earth sciences: spatial data-base software systems such as ArcGIS, which students master in the lab portion of the class. Employers across the geologic workforce have begun to require familiarity with this geographic information system for successful job and internship candidates.

Because the Geoscience Department has identified spatial data analysis and map interpretation as a key professional skill that students should master during their education, Geomorphology labs will focus increasingly on computer-based exercises and map analysis projects. This means that other student learning outcomes such as oral communication, critical thinking and foundational content in the area of environmental change will need more space in the lecture portion of the class. We propose to add an hour to the lecture format and make the class worth 4 credits, which will make it equivalent in depth, rigor and format to all other required classes in the Geology track.

Note on time to degree:

The addition of this extra credit hour will not impact any student's time to graduation or required total credits for their major. Under our proposed new curriculum (included elsewhere in this revision package), all upper level Geoscience courses will be incorporated as options rather than as required courses for our degree tracks. Each optional category requires two of the four

courses to be taken, and in these categories, most of the courses already carry four credits. Because of this, we have adjusted the overall program requirements so that the total major credits have actually decreased from 59 to 58 and free electives have therefore increased from 15 to 16. These changes were made to reduce curriculum 'bottle-necks,' shorten time to degree, and allow more flexibility for transfer students and students switching between our degree tracks.

Note on faculty work-load requirements

The Geoscience Department is aware that that the changes requested here will require additional faculty work-load to cover the added class time. Financially, this change will be covered by the additional credit load payments by students for the class as well as by our on-going commitment to teach very large lecture sections of Liberal Studies classes such as GEOS 101, GEOS 103 and GEOS 105 in order to cover the curricular costs of our smaller majors' courses. Operationally, the department will absorb this increase in work-load hours mainly by decreasing the number of workload-intensive non-major lab sections (GEOS 102, GEOS 104 and GEOS 106) that we teach each term, a change which synchronizes well with the recent change in Liberal Studies science requirements from 8 to 7 with its concomitant decrease in demand for laboratory science sections. Under our proposed new curriculum, we will also be able to schedule upper-level majors classes more judiciously so as not to spread our student load over too many options in each semester. Currently required courses such as GEOS 324 Geology of Oil & Gas or GEOS 352 Stratigraphy must be taught once every two years to allow students to graduate on time. With the optional menu of courses that is built into our new program, we can offer those courses at longer intervals if needed to accommodate the increased workload of other courses. Although not optimal, we believe these changes are worth making in order to achieve our student learning outcome goals.

PREVIOUS SYLLABUS OF RECORD

No previous syllabus of record can be found either in the department or university archives. The most recent syllabus of instruction is attached.

Geomorphology

Instructor: Katie Farnsworth

Office: Walsh 113

Email: kfarns@iup.edu

MW 11:15 - 12:05 pm in Walsh 104, Lab 2:30 – 5:15pm Walsh 108

Office Hours: M 1-3pm, T8:30-10am, F10-11:30

Readings:

1) Ritter, D.F., Kochel, R..C. and Miller, J.R., Process Geomorphology, Waveland Press, 2011.
2) Miscellaneous readings for discussion

Attendance: Although no record of attendance in class is taken, your regular attendance is expected, and because the most important course material is discussed in lecture, your learning will be enhanced by regular attendance. Furthermore, there is good evidence that regular attendance will improve your grade in the course. Therefore, your attendance is strongly encouraged. To encourage attendance and keep up-to-date with course information, provide practice for exams, and stress important material, occasional in-class assignments will be given in lecture. **If you miss an in-class activity, you will not be able to make it up.** If you have an extended absence, such as for a hospital stay or other serious problem, please see me to discuss.

Classroom Etiquette: The classroom is a place for learning. Students who disrupt classroom activities will be asked to leave and if they persist, may be removed from the course. This includes use of a cellphone for texting.

ADA Policy: Persons with disabilities requiring special accommodations to meet the expectations of this course are encouraged to bring this to my attention as soon as possible.

Grading: Final grades will be assigned based on your performance in the following areas:

Exams	Exams (20% each)	40 %
Quizzes	There will be approx 3 unannounced quizzes	10%
Assignments	Lab Assignments	25 %
	Problem Sets	15%
	In-Class Activities	10%

Exams: There will be a midterm and a final exam. They will cover both the lecture and lab material.

Lab Assignments: This will either be in-lab assignments or lab write-ups due at the beginning of the following lab. Each lab is designed to convey the excitement of investigating the surface of the Earth, and to provide hands-on experience collecting, manipulating and interpreting geomorphic information. Several of these labs will involve the collection of data in the field, and will take place *rain or shine.* Please come prepared for field labs with appropriate attire. Each lab will be due at the time of the next lab meeting, unless indicated differently.

Problem Sets: There will be homework assignments through the course of the semester. These will contain problem sets to help you learn to apply what you are learning in class. Due dates will be announced in class.

Late Policy: Grades will be docked by 10% for every day that an assignment is late. If an assignment is more than one week late, you will receive a zero for that assignment. If you have a medical/family excuse, please let me know immediately and please provide me with documentation. No exceptions.

Schedules: This schedule may change throughout the semester; I will let you know if and when this happens.

Lab Schedule

31.Aug	Map Review
07.Sep	Intro to ArcGIS
14.Sep	Landscape Ages
21.Sep	Streams and Rivers
28.Sep	Field Lab - Streams
05.Oct	Streams - Backup Field date
12.Oct	Finish up Stream Project
19.Oct	EXAM #1 : includes both lecture and lab material

Oct 22 and 23 : Weekend Fieldtrip to Lake Erie

26.Oct	No Lab - Due to Weekend Fieldtrip
02.Nov	Pennsylvania Glacial Landforms
09.Nov	Mass Wasting
16.Nov	Structural Landforms
30.Nov	Human Interactions
07.Dec	Case Study: California Coastline

Lecture Schedule		
Dates	Topics	Readings
8/29	What is Process Geomorphology	Chapter 1
8/31 - 9/7	Internal and External Forcings	Chapter 2
9/12 - 9/14	Establishing Timing in the Landscape	1. Easterbrook 2. Granger, Kirchel and Finkel
9/19 - 10/5	Fluvial Geomorphology	Chapter 5,6,7 and Milliman and Meade
10/10 - 10/12	Coastal Geomorphology	Chapter 13
10/17 - 10/19	Karst Landscapes	Chapter 12
10/20 - 10/26	Glacial Geomorphology	Chapter 9,10
10/31 - 11/2	Hillslope Processes	Chapter 4 and McPhee
11/7 - 11/9	Tectonic Geomorphology	1. Molnar & England 2. Anderson and Anderson
11/14 - 11/16	Eolian Processes	Chapter 8
11/21- 11/23	THANKSGIVING	
11/28 - 11/30	Human interaction with the landscape	Hooke and other readings
12/5 - 12/7	Case Study: California Coastal Zone	Outside Readings
12/12	Last Class - Catch-up and Review	