January 7, 2013

To,
Faculty Curriculum Committee
College of Charleston

Dear colleagues:

Attached is a proposal to change the name and course description of a course (GEOL 441) that I teach from “Aqueous Geochemistry” to “Pollution in the Environment.” I have taught this course over the past 6 years and have changed the course content and approach significantly enough to warrant the change. Originally, the course was designed as a survey of natural geochemical processes that occur in groundwater and surface water environments. Over the past three years, I made several changes to the course content including an increased focus on modern issues such as anthropogenic pollution that affects water quality in surface and groundwater environments. While the new course format centers on recent water and soil pollution case studies, the same original aqueous geochemical concepts are used to gain a quantitative understanding of environmental pollution. The laboratory component is also a better reflection of this new focus as we use a multitude of environmental geochemistry techniques to analyze polluted waters and soils. I find that our majors have a better appreciation of this use of geochemistry as a tool to characterize environmental pollution. The new name and description is a more accurate reflection of the course content and goals and will also make the course more attractive to a wider audience across non-geology disciplines.

Also attached is a support letter from Dr. Tim Callahan, Director of MES program as this course is currently cross-listed with EVSS 631: Pollution in the Environment.

Please feel free to contact me (843.608.9628 or VulavaV@cofc.edu) in case of questions.

Sincerely,

Vijay M. Vulava
Faculty Curriculum Committee
Course Form

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, please start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Vijay Vulava     Phone: 953-1922     Email: vulavav@voic.edu
Department or Program: Geology and Environmental Geosciences     School: SSM

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

I have taught this course over the past 6 years and have changed the course content and approach significantly enough to warrant the change. Originally, the course was designed as a survey of natural geochemical processes that occur in groundwater and surface water environments. Over the past three years, I made several changes to the course content including an increased focus on modern issues such as anthropogenic pollution that affects water quality in surface and groundwater environments. While the new course format centers on recent water and soil pollution case studies, the same original aqueous geochemical concepts are used to gain a quantitative understanding of environmental pollution. The laboratory component is also a better reflection of this new focus as we use a multitude of environmental geochemistry techniques to analyze polluted waters and soils. I find that our majors have a better appreciation of this use of geochemistry as a tool to characterize environmental pollution. The new name and description is a more accurate reflection of the course content and goals and will also make the course more attractive to a wider audience across non-geology disciplines.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

None
E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: Geology and Environ. Geosci. School: SSM Subject Acronym: GEOL Course number: 441

Credit hours: 03 lecture 01 lab __ seminar __ independent study
Contact hours: 03 lecture 03 lab __ seminar __ independent study

Course title: Aqueous Geochemistry

Course description (maximum 50 words, exactly as it appears in the catalog):
Course focuses on a quantitative understanding of the major classes of inorganic geochemical reactions that control the composition of natural and contaminated ground and surface water systems. Laboratory will focus on collection methods for ground and surface water samples, analysis of dissolved solutes and interpretation of water quality data. Lecture three hours per week; laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Prerequisites: CHEM 111 and CHEM 112 or GEOL 250; or CHEM 101 and GEOL 250; or the equivalent; or permission of the instructor.

Cross-listing, if any:

Is this course repeatable? □ yes □ no If yes, how many total credit hours may the student earn? _____

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Geology and Environ. Geosci. School: SSM Subject Acronym: GEOL Course number: 441

Credit hours: 03 lecture 01 lab __ seminar __ independent study
Contact hours: 03 lecture 03 lab __ seminar __ independent study

Course title: Pollution in the Environment

Course description (maximum 50 words, exactly as it appears in the catalog):
Course focuses on theoretical and quantitative skills required to assess how natural and anthropogenic factors influence pollutant behavior in Earth's near-surface environments, including fresh water and soils. Laboratory focuses on assessing pollutants in various environmental media using appropriate environmental techniques. Lecture three hours per week; laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Prerequisites: CHEM 111 and CHEM 112 or GEOL 250; or CHEM 101 and GEOL 250; or the equivalent; or permission of the instructor.

Cross-listing, if any (submit approval from relevant department): EVSS 631: Pollution in the Environment

Is this course repeatable? □ yes □ no If yes, how many total credit hours may the student earn? _____

Is there an activity, lab, or other fee associated with this course? □ yes □ no

Note: All fees require approval from the Board of Trustees.
If this is a newly-created course, is it intended to be the equivalent of an existing course? □ yes  □ no
If so, which course? ______________ Note: You must deactivate the course by submitting an additional Course Form.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

None. Current costs remain identical to old course.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

Not required for course name and description change.
I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? If so, please explain briefly and attach a Change Minor or Change Major/Program Form as appropriate.

None.

J. CHECKLIST.

☐ I have completed all relevant parts of the form.

☐ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

K. APPROVAL AND SIGNATURES.

1. Signature of Department Chair or Program Director:

   ________________________________ Date: 1/30/13

2. Signature of Academic Dean:

   ________________________________ Date: 2/11/13

3. Signature of Provost:

   ________________________________ Date: 3/7/13

4. Signature of Curriculum Committee Chair:

   ________________________________ Date: __________________

5. Signature of Faculty Senate Secretary:

   ________________________________ Date: __________________

Date Approved by Faculty Senate: __________________

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Dr. Vijay Vulava
Dept of Geology and Environmental Geosciences
College of Charleston

Dr. Vulava,

I have reviewed your Change of Course proposal for GEOL 441 and support your initiative to change the course title to better convey the topics of the course. As this course will be cross-listed with EVSS 631, also titled Pollution in the Environment, we will have a better chance of succeeding with our common goals of training Geology upper-level undergraduates and Environmental Studies Master’s students.

Best regards,

[Signature]

Tim Callahan
Director, Environmental Studies Graduate Program
Norman,

In reviewing your new course proposal for GEOL 469, the Registrar's office staff has noticed that the course is to have 3 contact hours of lecture and three contact hours of lab a week. Is it your intention that this course be a four credit course with an integrated lab component or is the lecture a three credit course and your intention to create a separate lab course (GEOL469L) for 1 credit hour?

If they are to be combined into one four hour course, please edit the course description to mention the laboratory component and the number of hours a week. If the lab is a separate course, please submit a separate new course form for GEOL 469L.

Thank you!
Cathy

Catherine C. Boyd
Registrar
College of Charleston
Charleston, SC 29424
Phone 843.953.1826
Fax 843.953.6560

NO response by
3/10/13
FACULTY CURRICULUM COMMITTEE COURSE FORM

Contact Name: Norman S. Levine    Email: levinen@cofc.edu    Phone: 843-953-5308

Department or Program Name: Geology and Environmental Geosciences    School name: SSM

Course Prefix, Number, and Title: GEOL, 469, Advanced GIS – Environmental and Hazards Modeling

I. CATEGORY OF REVIEW (Check all that apply)
(Note: For changes to course, if you check more than two separate changes, you must create a new course.)

- New Course (attach syllabus)
- Change Course
- Delete Course

☐ Approve for Cross-listing (attach rationale and written permission from relevant department)

☐ Intended to fulfill a General Education requirement (new courses only). If this box is checked, the course must also be submitted for review by the General Education Committee using this form.

Date (Semester/Year) the course will first be offered: Spring 2013

What are the prerequisites AND OTHER RESTRICTIONS (e.g., class level, major, co-requisite, credit for a mutually exclusive course)?

Geol 449 or EVSS 649 - Introduction to GIS or Permission of the Instructor

Will this course be added to the Degree Requirements of a Major, Minor, Concentration or List of Approved Electives?

a) ☐ Yes    ☑ No

b) If yes, complete and attach the CHANGE DEGREE REQUIREMENT form(s) for each affected program. List the name(s) of each program affected below:

II. NUMBER OF CREDITS and CONTACT HOURS per week

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Lab</th>
<th>Seminar</th>
<th>Ind. Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Contact Hours</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Credit Hours</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Is this course repeatable? ☐ yes ☑ no    If so, how many credit hours may the student earn in this course?
Advanced GIS: Environmental and Hazards Modeling; is designed to enhance student’s knowledge of and skills in the science and applications of Geographic Information systems. Topics include: Cloud GIS, Model building, Process automation, LIDAR and image processing and FEMA’s HAZUS. Prerequisites are Geol 449 or EVSS649 or permission of the instructor.

IV. RATIONALE or JUSTIFICATION: If course change or deletion—please provide reasons for change(s) to or deletion of a course. If a new course—briefly address the goals/objectives for the course, how the course supports a major or minor program, etc. For non-major courses address how the course supports the liberal arts tradition and the mission of the institution.

This course is an integral part of a robust Geographic Information Systems (GIS) program on campus. This class has been offered as a special topics class and has found wide interest and utility across disciplines. The overall goal of the course is to have the students expand their knowledge in capabilities in GIS through the application of advanced techniques including modeling, scripting (Java and Python), web-based data serving, and integration of stand-alone modules) to real world environmental and natural hazards problems. The course is designed with an integrated lab and lecture format that ensures that students meet the course goal though a series of projects that are designed to develop their critical thinking skills as GIS power users who can manage GIS projects from inception to completion.

The course supports the major in geology providing a technical skill set that is highly desired in both industry government and is an essential skill for students moving forward to graduate work. Furthermore it will fulfill the elective requirements in Discovery Informatics (Geoinformatics cognate). Resources (instructors and facilities) will also be shared with the MES program course (EVSS 669), which supports advanced work in the Masters of Environmental Studies, Public Administration, Historic Preservation and Marine Biology. This course was offered as a special topics class and drew students from the Graduate School and the schools of Sciences and Mathematics; Humanities and Social Sciences; Business; and Languages, Cultures, and World Affairs. It has a broad based appeal that is designed to be interdisciplinary in the best tradition of a liberal arts and sciences program.

This proposed new course GEOL 669 will be structured separately and students will be assessed and evaluated under a different set of rubrics as those in the graduate-level course EVSS 669 (proposed); see attachment.
<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student’s knowledge of and skills in the science and application of Geographic Information systems will be enhanced.</td>
<td>Basic functions of GIS and mapping would be covered in the introduction to GIS class. Skills tests at the start and the end of the course will be used to assess the student’s technical knowledge of the function as well as the implementation of the algorithms that define the GIS.</td>
</tr>
<tr>
<td>2. The ability to design and develop GIS-Based models and automation tools</td>
<td>Students will make use of online educational materials provided by Esri’s™ Virtual Campus- on the ESRI materials and 80% or better on the testing materials is required to move forward, they will also be required to create models for all of their projects which will be graded by the instructor.</td>
</tr>
<tr>
<td>3. To gain a deeper understanding of environmental modeling and environmental data management</td>
<td>All of the projects in the course will be based on either environmental issues ranging from Seal Level Rise (SLR) scenarios and runoff erosion mapping to integrating LIDAR and Multispectral data for Land use analysis and monitoring or completing a FEMA approved course of study that provides capabilities in the Hurricane, Flood, Earthquake modules of HAZUS. The National GIS-based hazards assessment mitigation and preparedness program.</td>
</tr>
<tr>
<td>4. Learn professional standards prepare professional quality reports and presentations</td>
<td>The standards presented by the Virtual campus and used by the South Carolina DNR and US E.P.A. and FEMA will be integrated into all student work. Students will be required to generate reports for each project that will conform to the current best practices for reporting and will be graded by the instructor.</td>
</tr>
</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education?

This course aligns directly with the learning outcomes in the department of Geology are to:
1. Identify, describe, and classify minerals, rocks and fossils, make scientific observations of these items in the field and in the laboratory, and interpret those observations in a scientifically sound manner;
2. Summarize and explain the enormity of time, the history of Earth and its processes, and the evolution of life as recorded in the fossil record; and
3. Analyze society’s dependence on Earth resources, the interaction between human activities and the natural environment, and the geological hazards faced by many communities.

As an upper level course it directly supports the third learning outcome of the department of Geology. Additionally it aligns with the outcomes for Discovery Informatics (data management and computer analysis) and with the Master’s of Environmental Studies.

This class introduces the students to new skills that will be used in better understanding the interactions between human activities and the natural environment. They will Learn directly how scientists model the natural environment and hazards developing a deeper understanding of the hazards and risk.
VII. IMPACT ON EXISTING PROGRAMS and COURSES: Please briefly document the impact of this new/changed/deleted course on other programs and courses; if deleting a course—list all programs that include the course; if adding/unchanging a course—explain any overlap with existing courses in the same or different departments.

This class will directly impact the Geology, Discovery Informatics, and the Graduate School (Masters of Environmental Studies program, Real Estate concentration in School of Business, Master of Public Administration program, Urban and Regional Planning certificate program, and Marine Biology) program by providing an additional advanced elective in Geospatial Science. This class does not overlap with any existing classes currently on the books at the College of Charleston. It capitalizes on the strengths of the Geology department in both GIS and Environmental Geosciences. The department has multiple faculty that directly teach and research in the areas that this course will support.
See attached New Course Proposal packet for the Graduate Education Curriculum Committee.

VIII. COSTS ASSOCIATED WITH THE ACTION REQUESTED: List all of the new costs or cost savings, (including new faculty/staff requests, library or equipment, etc.) associated with the action requested.

Currently no cost impact to the College of Charleston

The Geology Department has maintained instructor coverage for the previous Special Topics sections that this course is based on, but due to increasing demand, Academic Affairs should recognize this course as central to a large growth potential, both across undergraduate and programs and at the Graduate School (current programs and potential future degree and certificate programs).
IX. APPROVAL AND SIGNATURES

1. Signature of Department Chair or Program Director:
   
   [Signature]
   
   Date: 2/4/13

2. Signature of Academic Dean:

   [Signature]
   
   Date: 2/11/13

3. Signature of Provost:

   [Signature]
   
   Date: 3/7/13

4. Signature of Curriculum Committee Chair:

   
   Date:

5. Signature of Faculty Senate Secretary:

   
   Date:

   Date Approved by Faculty Senate:

   Following Senate approval, the Faculty Senate Secretary will forward the entire packet to the Registrar.
Tentative Syllabus

Instructor Information
Name: Dr. Norman S. Levine
Email: levinen@cofc.edu
Office location: NSCB 224F
Office hours: T TH 11:00-12:00
Phone: (843) 953 – 5308
Teaching Assistants: To be Assigned GIS lab TA

Prerequisites

- Introduction to GIS (Geol 449, EVSS 649 or Equivalent) or by permission of the Instructor

Course Goals

Course goals:
- Learn advanced GIS techniques, use modeling and scripting functions in ArcGIS, Become GIS "Power" Users
- Learn professional standards prepare professional quality reports and presentations
- Learn to use GIS-Based (Arc-based) add-ons and stand alone programs

Learning objectives:
- To enhance student’s knowledge of and skills in the science and application of Geographic Information systems.
- Develop the ability to design and develop GIS-Based models and automation tools
- To gain a deeper understanding of natural hazards modeling and mitigation.

Course Requirements

Introduction: This course is designed for students with understanding of and a passion for GIS. This course is designed to provide the students with the ability to develop and control GIS projects on their own. Students will work with concepts of Cloud GIS, Model building, process automation and FEMA’s HAZUS (Natural Hazards Analysis software). Students will work on independent and Group projects. Students will be required to present work to the class.
Policies

SPECIAL CONSIDERATIONS
SNAP students, to enable us to meet your accommodation needs, please present your Professor Notification Letter within the first two weeks of class. If you wish, you can speak to me about your needed accommodation either after class or during my office hours.

CHEATING AND PLAGIARISM
College of Charleston Honor Code spells out your responsibilities to yourself and your fellow students. You will produce your own work, and you will not cheat on tests or plagiarize written assignments. If you violate the Honor Code, the College Honor Board will be notified.

All Students will be expected to follow the College of Charleston Code of Conduct, Honor Policy and Santee Cooper Laboratory policies when in this class.

Attendance is not only strongly encouraged... it is required. You will not be able to get a top grade in the class without it. Miss three classes and your grade will be lowered one full step. Miss five classes and you Fail!

This class will be graded as follows:

- Homework Assignments: 20%
- ESRI Online Certificates: 10%
- Class Module Projects: 20%
- Final Class Project: 30%
- Tests and Quizzes: 20%
- Class Participation and Attendance: 10%

Additional information: This class requires in class assignments and out of class work. I have an Open Door policy. Do not hesitate to ask for help or ever voice your concerns or opinions about the class.

Textbooks - all materials will be provided online form existing sites or will be copied and placed on the OAKS system

Recommended reading: Online readings from the ESRI Virtual Campus and white papers
Recommended reading: GIS and Hydrology, Digital Terrain Models, LIDAR data Acquisition
Recommended reading: HAZUS-MH Basic Users Manual
Recommended reading: Canadian Remote Sensing Online Tutorial

Topic information
The class consists of 8 topics with a final group project making 9 sections for the class to cover. Depending on the semester Topic 5 or topic 6 will receive more emphasis that other topics.
Topic 1

Lesson: Introduction and Overview To Advanced GIS
Objectives: To ease the class into the world of high powered GIS.
Topics: Expectations -- What will this class cover.
Skills Test
Tools of the trade
Overview of topics to be covered
Getting on ESRI.com
Campus Logons
Assignments: Map Assignment - Student Addresses See where your skills are!! ESRI Geodatabase Workshop.

Topic 2

Lesson: Models and Modeling
Objectives: Basics of Models and Modeling Learning terminology of modeling Learning to use the Model Builder Extension in GIS Creating simple models and toolboxes
Topics: Model types Model limitations Parts of a model Modeling Environments
Readings: Online readings from ESRI on Modeling
Assignments: Learning GIS Model builder tutorial Simple modeling assignment

Topic 3

Lesson: Basic Inundation Model
Objectives: Create a simple Bathtub Inundation Model for a coastal region
Topics: Coastal modeling Flood modeling Questions of data accuracy precision and scale in modeling sea level; rise Saffir-Simpson Hurricane scale
Readings: 2 Journal articles on sea level rise modeling
Assignments: Create a hurricane inundation model for a section of the Low country in SC. prepare a write up and small poster for the work

Topic 4

Lesson: Run-off and Erosion
Objectives: Understanding the Run-off portion of the hydrologic Cycle. How run-off effects erosion
Established models for runoff and erosion
Topics: Precipitation and runoff in the hydrologic cycle The rational Method The SCS Curve Method of How Erosion and water flow fit in USLE and RUSLE - Erosion models
Readings: Journal articles on Rational Method, SCS curve method applications Article on RUSLE. Online material on Hydrology and run-off
Assignments: Create a Rational Equation Model for runoff in a watershed (Q = CIA) Create a SCS curve number model for the same watershed Create a RUSLE model for the watershed
Topic 5
Lesson: LIDAR – Multispectral Image integration
Objectives: Learn how to download process and Interpret LIDAR (LIght Detection And Ranging) Data then integrate the data with High Resolution Imagery (satellite and aerial) for land use classification with the GIS environment
Topics: Digital Terrain Models, LIDAR acquisition, Raster processing, Data Integration, Unsupervised and Supervised classifications
Readings: USGS and NOAA online Directives and white papers on LIDAR and DTM generation. ESRI and Canadian Remote Sensing Online Tutorial readings on unsupervised and supervised classifications
Assignments: Create a detailed land use analysis of a section of coastal Charleston County using downloaded LIDAR data and Co-registered Imagery.

Topic 6
Lesson: HAZUS -MH
Objectives: Complete the Basic FEMA Certification for the HAZUS-MH Hazard mitigation and assessment program
Topics: Complete the following Modules: Hurricane, Flood, Earthquake
Readings: HAZUS Training manuals and Materials for the FEMA Course
Assignments: Running the FEMA HAZUS GIS software

Topic 7
Lesson: Scripting and Add-ons
Objectives: Portability Key to Utility: Converting model to scripts
Topics: Native languages of the GIS Converting models to scripts Professional Look
Assignments: Convert One model to a Toolbox Convert one model to a menu Script

Topic 8
Lesson: Advanced mapping techniques
Objectives: Bringing it all together
Topics: Cloud GIS – porting and Pushing information to the world
Readings: Cartographic design and web-GIS practices (ESRI online)
Assignments: Create a informational poster / brochure and upload data to the Arc-Cloud Server for one of the assignments

Topic 9
Lesson: Final Projects
Objectives: Group Project
Assignments: Group Project have fun doing lots of stuff
FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
• Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
• Fill out the parts of the form specified in part B. **You must do this before your request can move forward!**
• Remember that your changes will not be implemented until the next catalog year at the earliest.
• If you have questions, please start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT INFORMATION.
Name: Mitchell Colgan  Phone: 3-7171  Email: colganm@cofc.edu
Department or Program: Geology and Environmental Geosciences  School: SSM

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.
[ ] Add a New Course (complete parts C, D, F, G, H, I, J, K)
[ ] Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
[ ] Course Number
[ ] Course Name
[ ] Course Description
[ ] Credit/Contact Hours
[ ] Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
[ ] Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
[ ] Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

Global climate and environmental changes are some of the most complex problems facing citizens today. The sheer complexities of these problems are mindboggling and has leads many to accentuate uncertainty and dismiss the causes of changes. This class uses paleoclimatological and geological methods to explore the Earth’s climate and environmental history to help the students to learn about the short-term and long-term interaction between the Earth’s Systems. The exploration of the past provides the students with a foundation to evaluate the causes and consequences of current global changes. The class has been taught as a special topics course. I also incorporated material and methods used in my graduate Earth System Science class.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

There should be not impact on other departments.
E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: 
School: 
Subject Acronym: 
Course Number: 

Credit hours: ___ lecture ___ lab ___ seminar ___ independent study
Contact hours: ___ lecture ___ lab ___ seminar ___ independent study

Course title: 
Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Cross-listing, if any: None

Is this course repeatable? ☐ yes ☐ no If yes, how many total credit hours may the student earn? _____

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Geology 
School: SSM 
Subject Acronym: Geol 
Course number: 288

Credit hours: 3 lecture 0 lab ___ seminar ___ independent study
Contact hours: 3 lecture 0 lab ___ seminar ___ independent study

Course title: Global Change: A Geological Perspective

Course description (maximum 50 words, exactly as it appears in the catalog):
The Earth's climate has changed throughout its history and it will change in near the future. The class draws from geology, chemistry, meteorology, and oceanography to explore the geological record and the contemporary Earth System processes to provide students with an understanding of the complexity of global change.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Pre-requisites Geol 105.

Cross-listing, if any (submit approval from relevant department):

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? _____

Is there an activity, lab, or other fee associated with this course? ☐ yes ☒ no

Note: All fees require approval from the Board of Trustees.

If this is a newly-created course, is it intended to be the equivalent of an existing course? ☐ yes ☒ no
If so, which course? ____________ Note: You must deactivate the course by submitting an additional Course Form.
G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

Zero.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the course?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
<tr>
<td>1. To learn paleoclimatological methods using sediment, coral, and ice cores to interpret climate history</td>
<td>Exercises will test the students’ ability to reconstruct climate history for geological cores.</td>
</tr>
<tr>
<td>2. To understand the interaction of the Earth systems and how these interaction effected the Earth’s climate history</td>
<td>Students will be evaluated using a pre and post assessment tests on Earth systems. Problem sets will assess knowledge of interactions of earth systems</td>
</tr>
<tr>
<td>3. To learn the similarities and differences of natural and anthropogenic factors that alter climate.</td>
<td>Problem sets will assess knowledge of natural and anthropogenic factors that alter climate.</td>
</tr>
<tr>
<td>4. To understand the rate and degree of palaeoclimate change and how past changes compare to causes and consequences current events.</td>
<td>Students will be evaluated using a pre and post assessment tests to determine if they can knowledgeably discuss the causes and consequences of climate change.</td>
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</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course? The course support all three of the department’s learning outcomes.

1. identify, describe, and classify minerals, rocks and fossils; make scientific observations of these items in the field and in the laboratory; interpret their observations in a scientifically sound manner;
2. summarize and explain enormity of time, the history of the Earth and its processes, and the evolution of life as recorded in the fossil record
3. analyze society’s dependence on Earth resources, the interaction between human activities and the natural environment, and the geological hazards faced by many communities;

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? If so, please explain briefly and attach a Change Minor or Change Major/Program Form as appropriate.

No.
J. CHECKLIST.

☑ I have completed all relevant parts of the form.

☑ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☑ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

K. APPROVAL AND SIGNATURES.

1. Signature of Department Chair or Program Director:

   [Signature]

   Date: 2/4/13

2. Signature of Academic Dean:

   [Signature]

   Date: 2/11/13

3. Signature of Provost:

   [Signature]

   Date: 3/7/13

4. Signature of Curriculum Committee Chair:

   [Signature]

   Date: ______________

5. Signature of Faculty Senate Secretary:

   [Signature]

   Date: ______________

Date Approved by Faculty Senate: ______________
Global Change: A Geological Perspective - Geol 288

INSTRUCTOR: Dr. Mitchell Colgan

DESCRIPTION: The Earth’s climate has changed throughout its history and it will change in near the future. The class draws from geology, chemistry, meteorology, and oceanography to explore the geological record and the contemporary Earth System processes to provide students with an understanding of the complexity of global change.

LEARNING OUTCOMES
By the end of this course you should be able to:
1. To learn paleoclimatological methods from sediment, coral, and ice cores to interpret climate history
2. To understand the interaction of the Earth systems and how these interactions affected the Earth’s climate history
3. To learn the similarities and differences of natural and anthropogenic factors that alter climate.
4. To understand the rate and degree of palaeoclimate change and how it compares to causes and consequences current events.

READINGS:
IPCC Fourth Assessment Report (Oaks)
Journal Articles This class will rely on additional readings from scientific journals and other sources, and these readings are on OAKS

Readings for each lecture must be done before class. Please complete the assignments as scheduled and come to class with any questions that arise. I will be maintaining the Oaks site for the class; lectures, readings, and images will be available on Oaks.

GRADING POLICY: There will be 2 exams and a term paper

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Final Grade %</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>30</td>
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<tr>
<td>Exam 2</td>
<td>30</td>
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<tr>
<td>Homework</td>
<td>10</td>
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<tr>
<td>Cores interpretation</td>
<td>30</td>
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</table>

ATTENDANCE POLICY: You are expected to attend all class meetings. Roll will be taken daily. A student with more than three unexcused absences will be dropped from the class.

OFFICE HOURS: My office hours are on Monday and Wednesday between 8:00 and 10:00, or by appointment. My office is in Room 339B in the Science Center. Phone # 3-7171. You can e-mail me at either mcolgan@loki.cofc.edu or colganm@cofc.edu
<table>
<thead>
<tr>
<th>Topic</th>
<th>Chap</th>
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<tbody>
<tr>
<td>Framework of Palaeoclimate Science</td>
<td>1</td>
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<tr>
<td>Atmosphere Basics</td>
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<td>Oceans Basics</td>
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<td>ENSO Data and history</td>
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<tr>
<td>Paleoclimatology Methods</td>
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<td>Paleoclimatology Methods - Isotopes</td>
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<td>Core analysis</td>
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<td>Carbon cycle - Fast and slow</td>
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<td>CO₂ and Long-Term Climate</td>
<td>4</td>
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<td>Long term Climate</td>
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<td>Greenhouse Climate</td>
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<td>Greenhouse to Icehouse</td>
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<td>Astronomical Control of Solar Radiation</td>
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<td>Methane</td>
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<td>Cenozoic Climate history</td>
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<td>PETM</td>
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<td>Insolation Control of Monsoons</td>
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<td>Insolation Control of Ice Sheets</td>
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<tr>
<td>Orbital-Scale Changes in Carbon Dioxide</td>
<td>10</td>
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<tr>
<td>Glacier Cycles</td>
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<td>Orbital-Scale Interactions, Feedbacks, and Unsolved Problems</td>
<td>11</td>
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<tr>
<td>Last Glacial Maximum</td>
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<td>Last Glacial Maximum</td>
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<td>Last Glacial Termination</td>
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<td>Test</td>
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<tr>
<td>Climate During and Since the Last Deglaciation</td>
<td>13</td>
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<td>Younger Dryas Event</td>
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<td>Millennial Oscillations of Climate</td>
<td>14</td>
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<tr>
<td>Humans and Preindustrial Climate</td>
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<td>Climate Changes During the Last 1000 Years</td>
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<td>Climate Changes Since 1850</td>
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<tr>
<td>Population</td>
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<tr>
<td>Causes of Warming over the Last 125 Years</td>
<td>18</td>
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<td>Most recent records of change</td>
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<td>Comparison of Modern to Past climate events</td>
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<td>A review of the Arctic palaeoclimate history</td>
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<td>Arctic today</td>
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<td>Examination of recent drought and floods</td>
<td>IPCC</td>
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<td>Projections and climate models</td>
<td>IPCC</td>
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<tr>
<td>Discussions about the future</td>
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