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

Department Name: Environmental Studies   Graduate Program name: MES

Course Prefix, Number, and Title: EVSS 669

I. CATEGORY OF REVIEW (Check all that apply)

NEW COURSE    CHANGE COURSE    DELETE COURSE
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☑ New Course (attach syllabus*)
☐ Change Number (IV, VII, VIII, IX)  ☐ Delete Course (IV, VII, IX)
☐ Change Title (IV, VII, VIII, IX)
☐ Change Credits/Contact hours (II, IV, VII, IX)
☐ Prerequisite Change (IV, VII, VIII, IX)
☐ Edit Description (III, IV, VII, VIII, IX)

☑ Approve for Cross-listing (attach Graduate Permission to Cross-list Form)

Date (Semester/Year) the course will first be offered, course changes or deletion will go into effect: Fall 2013

NEW COURSE:

*ATTACH THE SYLLABUS FOR A NEW GRADUATE COURSE to include:

• Course description and objectives
• Method of teaching (e.g., lecture, seminar, on-line, hybrid)
• Required and optional texts and materials
• Graduate School Grading Scale
• Assignments, student learning outcomes and assessment components
• Policies to include attendance, Honor Code, American Disabilities Act statement
• Tentative course schedule with specific topics
List prerequisites and/or other restrictions below

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

Will this course be added to the Degree Requirements?

a) [ ] Yes   [x] No

b) If yes, explain

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**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>
</tbody>
</table>

B. Credit Hours 4

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Is this course repeatable? [ ] yes  [x] no  If so, how many credit hours may the student earn in this course?

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**III. CATALOG DESCRIPTION** Limit to 50 words EXACTLY as you want it to appear in the catalog: include prerequisites, co-requisites, and other restrictions. If changing course description, please include both old and new course descriptions.

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 EVSS 649 or permission of the instructor.

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**IV. RATIONALE / JUSTIFICATION:** If course change – please indicate the course change details. 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 and the relationship to the strategic plan.

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, 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 graduate-level GEOL 669 will be structured separately and students will be assessed and evaluated under a different set of rubrics as those in the undergraduate-level course Geol 469; see attachment.

V. 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>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</td>
</tr>
</tbody>
</table>
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.

4. Learn professional standards prepare professional quality reports and presentations

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.

This course aligns directly with the learning outcomes of the MES Program:

- demonstrate knowledge and skill in Environmental Science (biophysical and social) Data Analysis
- demonstrate knowledge and skill in Environmental Policy Analysis
- demonstrate knowledge and skill of Environmental Studies and Communication

This course supports all three of the learning outcomes in the MES program the class is designed to teach enhanced data analysis techniques, projects are linked to practical public policy issues, and students are required to write formal reports and give presentations on their projects.

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.

II. IMPACT ON EXISTING PROGRAMS and COURSES: Please briefly document the impact and expected changes of this new/changed/deleted course on other departments, programs and courses; if deleting a course—list all departments and programs that include the course; if adding/changing a course—explain any overlap with existing courses in the same or different departments; if adding or deleting a course that will be part of a joint program identify the partner institution.

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. New courses requiring additional resources will need special justification.

Currently no cost impact to the College of Charleston

The Geology Department has maintained instructor coverage for 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

Signature of Program Director:

Date: 2/11/13

Signature of Department Chair:

Date: 2/4/13

Signature of Additional Chair*:

Date: 

Signature of Schools’ Dean:

Date: 2/11/13

Signature of Additional Schools’ Dean*:

Date: 

Signature of the Provost:

Date: 3/7/13

Signature of Budget Director/Business Affairs Office:

Date: 

*For interdisciplinary courses

Return form to the Graduate School Office for Further Processing

Signature of Chair of the Faculty Committee on Graduate Education, Continuing Education & Special Programs:

Date: 4/4/2013

Signature of Chair of the Graduate Council:

Date: 4/16/13

Signature of Faculty Senate Secretary:

Date: 

Date Approved by Faculty Senate: 

GRADUATE PERMISSION TO CROSS-LIST FORM

This form must ALWAYS be accompanied by a graduate COURSE FORM.

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

Department and School Name: Geology / SSM

Name and Acronym of Graduate Program: Masters of Environmental studies / MES

Date (Semester/Year) cross-listing will take effect: spring 2013

Fall 2014

I. CATEGORY OF REVIEW (Check all that apply)

☒ New Course -- Course Number/Title EVSS 669
☐ Existing Course -- Course Number/Title
☐ Special Topic Course -- Course Number/Title

This course will be cross-listed with an

☒ undergraduate course (complete sections II, III, and IV below)
☐ existing graduate course (complete section IV below)

II. CURRICULUM DIFFERENCES – UNDERGRADUATE AND GRADUATE LEVELS

Please submit separate syllabi for both graduate and undergraduate courses

☐ Syllabi for both undergraduate and graduate courses are attached ☒ YES ☐ NO to be provided (BUT)

Explain the differences between the syllabi in terms of requirements, learning objectives and course content

The syllabi differ in several key areas between the Graduate and undergraduate sections of the class. Graduate students will have 2 additional assignments during the class and one additional task in the final project section of the class. Graduate students will be expected to act as a team leader for a group project, will be required to write one additional summary paper on the application of GIS to their course of study and to make a presentation to the class on one GIS model they build or an advanced tool used in their research.

September 2011
III. APPROVAL SECTION – GRADUATE COURSE WITH UNDERGRADUATE COURSE

Undergraduate Course Number / Title Geol 469

Names and Signatures:

Name of Department Chair of the Graduate Course

Signature ___________________________ Date: ___________

Department Chair of the Undergraduate Course Mitchell Colagn

Signature ___________________________ Date: ___________

Graduate Program Director Tim Callahan

Signature ___________________________ Date: ___________

Provost

Signature ___________________________ Date: ___________

IV. APPROVAL SECTION – GRADUATE COURSE WITH EXISTING GRADUATE COURSE

Graduate Course Number / Title of Existing Graduate Course

Program(s) of Existing Graduate Course

Names and Signatures:

“Host” Program Director

Signature ___________________________ Date: ___________

“Requesting” Program Director

Signature ___________________________ Date: ___________

Provost

Signature ___________________________ Date: ___________
Return form to the Graduate School Office for Further Processing

Signature of Chair of the Faculty Committee on Graduate Education, Continuing Education & Special Programs:

[Signature]  Date: 4/6/2013

Signature of Chair of the Graduate Council:

[Signature]  Date: 4/16/13

Signature of Faculty Senate Secretary:

[Signature]  Date: [Blank]

Date Approved by Faculty Senate: [Blank]
Graduate 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

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.

Requirements: Knowledge of the ESRI ArcGIS System. Basic knowledge of Excel and Access
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
PLIAGIRISM
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.

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This class will be graded as follows if depending of the number activities and assignments based on a total point system of between 800 and 1200 points:
For example:
Homework Assignments 200
Online Certificates 100
Class Module Projects 300
Final Class Project 300
Tool – Script presentation ............100 **
Tests and Quizzes 100
Class Participation and Attendance 50
( ** a graduate student only assignment)

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
Recommended reading: Online readings from the ESRI Campus
Recommended reading: GIS and Hydrology
Recommended reading: HAZUS-MH Basic Users Manual
**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 Graduate students only prepare a 3 minute presentation of and ESRI arcScript add on that would be useful in your research area

**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 Graduate students include a powerpoint of how to use your tool
**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: 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 Graduates write a 1 page summary of how to use HAZUS data sets in your own research

**Topic 6**

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 7**

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 8

Lesson: Final Projects

Objectives: Group Project

Assignments: Group Project have fun doing lots of stuff. Graduates act as group leaders and section heads responsible for the organization and management of the projects.
Undergraduate 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
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