GEORGE MASON UNIVERSITY  
Graduate Course Inventory Form  
(Prepare and forward with you course proposal to the Graduate Council)  

<table>
<thead>
<tr>
<th>Local Unit: SCS</th>
<th>Graduate Council Approval Date:</th>
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</thead>
<tbody>
<tr>
<td>Course Abbreviation: EOS</td>
<td>Course Number: 680</td>
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<tr>
<td>Full Course Title: Environmental Applications of Integrated Geographic Information Technologies</td>
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<tr>
<td>Abbreviated Course Title (maximum 24 characters): Geographic Information Technologies</td>
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<tr>
<td>Credit Hours: 3</td>
<td>Programs of Record: CSI Ph.D.; BIOD Ph.D.</td>
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**Repeatable for Credit**:  
D = Yes, not within the same term  
T = Yes, within the same term  
N = Cannot be repeated for credit  

**Activity Code**:  
___X___ LEC – Lecture, ___LAB.– Lab, ___RCT – Recitation,  
___STU – Studio, ___IND – Independent Study, ___INT – Internship  

**Catalog Credit Format**: _3 _:_3 _:_0  

**Course Level**: GF (500-600) _ X GA (700+) ___  

**Maximum Enrollment**: _____25____  

Submit for new courses - First term to be offered: ___S04___  

**Prerequisites**: GEOG 550, GEOG 575, or CSI 754, or permission of instructor.  

**Catalog Description for the course proposal (35 words or less)**: The course focuses on how geoinformation technologies, namely GIS, RS, and GPS, and spatial analytical techniques, can be used in an integrated manner to address various situations in environmental risk assessment, monitoring, and planning.  

Submit for modified or deleted courses as appropriate:  

**Last Term Offered**: _____  
**Previous Course Abbreviation**: _____  
**Previous Number**: _____  

**Description of modification**: This is a new course, crosslisted with BIOD 742  

**Approval Signatures**:  
Dept/Prog: ___________________________ Date: __________  
College Committee: ___________________________ Date: __________  
Graduate Council Representative: _______________________________ Date: __________
I. Course Description: New Course

II. Catalog Description:

   A. Course Designation: EOS 680 Environmental Applications of Integrated Geographic Information Technologies

   B. Credit Hours: 3

   C. Prerequisites: GEOG 550, GEOG 585, or CSI 754, or permission of instructor.

   D. Catalog description: The course focuses on how geoinformation technologies, namely GIS, RS, and GPS, and spatial analytical techniques, can be used in an integrated manner to address various situations in environmental risk assessment, monitoring, and planning.

   E. Equipment: None

III. Course Justification

   A. Course objectives: To understand and be able to utilize various Geographic Information technologies (GIS, RS, GPS) in an integrated manner to conduct various types of environmental assessment and monitoring, and planning, including the pre-planning, tracking of, and response to a bio-weapon attack.

   B. Course requirements:

   3 literature reviews: 30%
   term project: 50%
   presentation: 20%

   C. Course relationship to any similar course: This course will be crosslisted with BIOD 742.

IV. Scheduling and Proposed Instructors

   Time of initial offering: Spring 2004

   Proposed instructors: David Wong, Liping Di
Tentative Syllabus:

EOS 680
Environmental Applications of Integrated Geographic Information Technologies
Instructor: David Wong

The purpose of this course is to demonstrate how Geographic Information Technologies (GI Technologies) and spatial analytical techniques and models can be used in an integrated manner to address environmental and socioeconomic problems or issues. Geographic Information Technologies include Geographic Information Systems (GIS), Remote Sensing (RS), and Global Positioning Systems (GPS), and Geographic Information Science (GIScience) is the science supporting these technologies. Spatial Analysis involves the suite of techniques and models for analyzing spatial data, data manipulated and handled by (GI Technologies). Existing courses have addressed how each of these technologies is useful independent of each other, but it is also well known, and has been demonstrated that integrated GI Technologies together with spatial analytical techniques are extremely powerful to address a range of issues and problems. The course will help students moving toward the use of these technologies in an integrated manner. Using applications in environmental monitoring/assessment and in urban planning, the course will not only provide students a good appreciation of the power of the integrated technologies, but also addresses pertinent issues and impediments related to the integration of these technologies and techniques. By finishing this course, students will be able to use more than one GI technology to solve or address real-world problems or issues.

Prerequisites: GEOG 550, GEOG 575, or CSI 754, or permission of instructor.

Text:

Optional text:

Outline

Fundamental Concepts in GI Science
Review of Selected GIS Concepts
- raster data modeling and analysis
- vector data modeling and analysis
Review of Selected Remote Sensing Concepts
- spectral signatures and environmental phenomena
- feature extraction and identification
Overview of GPS Concepts
Major Categories of Environmental Model in GISciences
Major issues in Integrating GI Technologies
- data format compatibility
- models integrating GIS and Remote Sensing
- analytical capabilities in GIS and Remote Sensing Software
- field data collection and distributed spatial databases access
Application examples:
- environmental epidemiology
- environmental risk monitor and assessment
- "real-time" event tracking
- emergency planning and response

Class presentations

Grading

3 literature reviews: 30%
term project: 50%
presentation: 20%

Reviews
Submit 3 reports over the entire semester, one for each review of a journal article on integrating GI technologies. Each review should be typed, double-spaced, approximately two pages (500 words).

Project
Students are required to submit a paper describing a research project, which demonstrates how different GI technologies can be integrated to address an environmental or socioeconomic problem. The paper should identify major issues related to integration and spatial analysis. More detailed requirements of the project will be given during the semester. Associated with the project is a presentation at the end of semester.