George Mason University
Graduate Course Approval/Inventory Form

Please complete this form and attach a copy of the syllabus for new courses. Forward it as an email attachment to the Secretary of the Graduate Council. A printed copy of the form with signatures should be brought to the Graduate Council Meeting. Complete the Coordinator Form on page 2, if changes in this course will affect other units.

Please indicate:  _X_ NEW  ____ MODIFY  ____ DELETE

Local Unit: SCS  Graduate Council Approval Date: 

Course Designation: EOS  Course Number: 773

Full Course Title: Interoperability of Geographic Information Systems

Abbreviated Course Title (24 characters max.): Interoperability of GIS

Credit hours: 3  Program of Record: ESS M.S., CSI Ph.D.

Repeatable for Credit?  
_ _ D=Yes, not within same term  Up to hours
_ _ T=Yes, within the same term  Up to hours
_ _ N=Cannot be repeated for credit

Activity Code (please indicate):  _X_ Lecture (LEC)  ____ Lab (LAB)  ____ Recitation (RCT)
  ____ Studio (STU)  ____ Internship (INT)  ____ Independent Study (IND)  ____ Seminar (SEM)

Catalog Credit Format  3: 3: 0  Course Level: GF(500-600)  ____ GA(700+)  _X_

Maximum Enrollment: 20  For NEW courses, first term to be offered: Fall 2004

Prerequisites: EOS 754 and GEOG 553 or a course in GIS

Catalog Description (35 words or less): This advanced course addresses theories, standards, and implementations of Web-based interoperable geographic information systems for on-line data and information services. International standards, including OGC, and associated tools for interoperability will be reviewed in detailed.

For MODIFIED or DELETED courses as appropriate:
Last term offered:  Previous Course Abbreviation:  Previous number:

Description of modification:

APPROVAL SIGNATURES:
Submitted by:  _____________________________________ email: __________________

Department/Program:  _____________________________________ Date: ________________

College Committee:  _____________________________________ Date: __________________

Graduate Council Representative:  _____________________________________ Date: ____________
**Approval from other units:**

Please list those units outside of your own who may be affected by this new, modified, or deleted course. Each of these units must approve this change prior to its being submitted to the Graduate Council for approval.

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Graduate Council approval: __________________________ Date: __________

Graduate Council representative: ______________________ Date: __________

Provost Office representative: ________________________ Date: __________
Course proposal to the Graduate Council
by
The School of Computational Sciences

1. COURSE NUMBER AND TITLE:

EOS 773 Interoperability of Geographic Information Systems

Prerequisites: EOS 754 and GEOG 553 or a course in GIS

Catalog description: This advanced course addresses theories, standards, and implementations of Web-based interoperable geographic information systems for on-line data and information services. International standards, including OGC, and associated tools for interoperability will be reviewed in detailed.

2. COURSE JUSTIFICATION

Course Objectives: The objectives of this course are to provide an in-depth review on the history and theories on the standards of geographic data, especially related to the OGC and other international standards. The course will also address issues related to the interoperability of GIS in the Internet environment. Specific implementations of Web-based interoperable geographic information systems for on-line data and information services will be discussed.

Course necessity: Given the high degree of heterogeneity of spatial data (GIS and remote sensing data), it is important to address the interoperability issues, which are major obstacles in accessing diverse databases. This is an important advanced topics for students focusing on the use of massive Earth science and remote sensing data.

Course relationship to Exiting Programs: This course has been taught at least twice as CSI 759 Special Topics. This course will serve as an elective for students in MS in ESS and Ph.D. in CSI in the Earth Observing track.

Course relationship to Other Existing Courses: There is no similar course offered at GMU. The one closest is Distributed GIS offered by SCS. But the proposed course focuses on standards and the other course focuses on design, implementation and distributed GIS in general.

3. APPROVAL HISTORY

4. SCHEDULING AND PROPOSED INSTRUCTORS

Semester of Initial Offering: Fall 2004

Proposed instructors: Dr. Liping Di

5. TENTATIVE SYLLABUS: See attached.
Course Overview
This is an advanced course designed for students who are interested in theory, standards, and implementation of Web-based interoperable geographic information systems for on-line data and information services. Students registered to this class should have previous knowledge of Geographic Information Systems and should have some Web-based programming experience.

Prerequisite: EOS/CSI 754, Geog 553, or permission of instructor

Text: None

Major References: The standards and interoperability specifications discussed in this course can be found in the following websites:
1. Federal Geographic Data Committee (FGDC): http://www.fgdc.gov
2. International Organization for Standardization (ISO) TC 211: http://www.isotc211.org

The instructor will also provide some draft standards and specifications, which are not available through those websites, for discussions.

Course Work: The work of the semester will consist of readings of selected interoperability standards and specifications. Each student is required to give two presentations of standard or specification reviews, each for about twenty to thirty minutes. There is no mid-term or final exam for this course. However, students have to turn in a paper of their selected topics related to interoperability of Geographic Information Systems at the end of the semester. Grades will be determined from daily work in the seminars, presentations of standard reviews, and the paper.

Grading: Presentation and class discussions: 40%
Semester paper: 60%

Syllabus:

Week 1 (August 28): Introduction of the course; what is Geographic Information Systems; the definition of GIS interoperability.

Week 2 (September 4): The needs and level of interoperability; How to make the GIS interoperable (The roles of standards); Types of Geographic Information Standards, their definitions, and roles; Who are the major players in defining federal, national, and international standards on geographic information and their relationships.
Week 3 (September 11): Introduction to Federal Geographic Data Committee and their roles; Introduction to FGDC standards on geographic information.

Week 4 (September 18): Information on US national GIS standards; the International and National Committee on Information Technology Standards (INCITS) Technical Committee L1 and their roles; The ISO TC 211 organization; The ISO 191XX series of standards.

Week 5 (September 25): What is metadata? The FGDC Content Standard for Geospatial Metadata; the FGDC Remote Sensing Metadata Extensions; The ISO 19115 Geographic Information—Metadata; The relationship between those metadata standards; The ANSI adoption processes of ISO metadata standards.

Week 6 (October 2): ISO 191XX Standards on Imagery, and current ISO TC 211 projects on imagery and gridded data. Assign standards to students for review.

Week 7 (October 9): Presentation of standard reviews by each students and discussions.

Week 8 (October 16): Introduction to Open GIS Consortium, its organization, roles, and activities; OGC SP and IP programs; OGC Abstract Specifications on geographic information; OGC Implementation Specifications; The relationships between geographic information standards; The relationship between ISO standards and OGC specifications.

Week 9 (October 23): OGC Web Map Service Specification (WMS); OGC Web Coverage Service Specification (WCS); OGC Web Feature Service Specification (WFS); OGC Web Registries Service Specification (WRS). Assign OGC specifications to students for review.

Week 10 (October 30): No class, ISO TC 211 plenary. Students should review the specifications and prepare the presentations.

Week 11 (November 6): Presentation of specification reviews by each students and discussions.

Week 12 (November 13): Web-based interoperable Geographic Information Services; OGC Web service architecture and technology.


Week 14 (November 27): Thanksgiving Recess. No class. Please think about the topic of the semester paper.

Week 15 (December 4): Where are the interoperability technologies heading (Classroom discussions). Also each student should give a short presentation about the topic of his/her semester paper.

The last day for turning in the semester paper: December 18, 2003.