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: 772

Full Course Title: Distributed Geographic Information Systems

Abbreviated Course Title (24 characters max.): Distributed GIS

Credit hours: 3  
Program of Record: MS ESS and Ph.D. CSI

Repeatable for Credit?  
D=Yes, not within same term  Up to hours  
T=Yes, within the same term  Up to hours  
X 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: F04

Prerequisites: An introductory course in GIS and some programming experience, or Permission of Instructor

Catalog Description (35 words or less): This course examines different aspects of science and technology in the context of distributed GIS. Issues included are general concepts, architecture, component design, component development, and system integration as well as other advanced topics, such interoperability and agent-based GIS.

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:  
GEORGE MASON UNIVERSITY
Course Coordination Form

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.

<table>
<thead>
<tr>
<th>Unit:</th>
<th>Head of Unit’s Signature:</th>
<th>Date:</th>
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Graduate Council approval: ___________________________ Date: __________

Graduate Council representative: ______________________ Date: __________

Provost Office representative: ________________________ Date: __________
1. COURSE NUMBER AND TITLE:

EOS 772 Distributed Geographic Information Systems

Prerequisites: An introductory course in GIS and some programming experience, or Permission of Instructor

Catalog description: This course examines different aspects of science and technology in the context of distributed GIS. Issues included are general concepts, architecture, component design, component development, and system integration as well as other advanced topics, such interoperability and agent-based GIS.

2. COURSE JUSTIFICATION

Course Objectives: This course will examine different aspects of science and technology on distributed GIS. Issues included are general concepts, architecture, component design, component development, system integration as well as certain specific topics, such as interoperability of distributed GIS and agent-based distributed GIS. Upon the completion of this course, students are expected to possess the skills to prototype distributed GIS software, or design and initiate development of distributed GIS applications by using commercial packages

Course necessity: There is no such course in SCS or in GMU addressing theories and concepts related to the operations of Geographic Information Systems in a distributed environment. Internet GIS is the future of GIS. It is important to students to learn the new trend in handling and disseminating geographic information and be able to involve in the operations.

Course relationship to Exiting Programs: This course will serve as an elective for students in MS in ESS and Ph.D. in CSI in the Earth Observing track. It will also serve students in MS Geography in CAS.

Course relationship to Other Existing Courses: There is no similar course offered at GMU. The one closest is the Interoperability in GIS offered by SCS, but the two address different aspects of distributed GIS.

3. APPROVAL HISTORY

4. SCHEDULING AND PROPOSED INSTRUCTORS

Semester of Initial Offering: Fall 2004

Proposed instructors: Dr. Chaowei (Phil) Yang

5. TENTATIVE SYLLABUS: See attached.
EOS 772 Distributed Geographic Information Systems  
Instructors: Dr. Chaowei (Phil) Yang, Dr. David W. Wong  
Place: DK Room 2054, Date: Tuesday, Time: 0720pm-1000pm

Course Description
This course will examine different aspects of science and technology on distributed GIS. Issues included are general concepts, architecture, component design, component development, system integration as well as certain specific topics, such as interoperability of distributed GIS and agent-based distributed GIS.

Upon the completion of this course, students are expected to possess the skills to prototype distributed GIS software, or design and initiate development of distributed GIS application by using Intergraph or ESRI distributed GIS solutions.

Students will gain hands-on experience of distributed GIS by using ESRI or Intergraph’s distributed GIS solutions. The project and three homework will develop the students’ capability of preparing information through Internet, designing and developing GIS GUI component and service component, integrating data from different sources, and creating integrated distributed GIS system. An Intergraph guest lecture is scheduled to address current capabilities and likely product evolution.

Intergraph distributed GIS solution (GeoMedia WebMap Professional, IntelliWhere OnDemand, IntelliWhere LocationServer) and ESRI distributed GIS solution (ArcIMS/ArcPad) will be used both as examples for application development and as basis for interpreting internal system functions.

Prerequisite
An introductory course of GIS, knowing Java or other OO programming languages, or permission by instructors

Contact Information

<table>
<thead>
<tr>
<th>Chaowei (Phil) Yang</th>
<th>David W. Wong</th>
</tr>
</thead>
<tbody>
<tr>
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References
Because distributed GIS is a relatively new field, no book is ready for use as a text. Most of the content will be based upon research articles and document related to commercial packages. Following books and documents could serve as initial references:

3. Terry Bossomaier, David R. Green, 2001, Online GIS and Metadata, New York, Taylor&Francis
5. Intergraph, 2002, GeoMedia WebMap Professional document
7. ESRI, 2002a, ArcIMS document
8. ESRI, 2002b, ArcPad document
Programming Language
Java

Grading
Each homework problem set includes the design or analysis document and related program. Put all the documents on your personal homepage, and email the webpage address to the following address: cyang3@gmu.edu. They will be graded according to following score design.

Homework #1, #2, #3 → 60% (equally split)
Project → 30%
Presentation → 10%

Homework and Project
Homework#1: Review other people’s views of distributed GIS using information searched from Internet. Analyze at least 3 distributed systems through reading related documents (ArcIMS, GeoMedia WebMap Professional, IntelliWhere OnDemand and IntelliWhere Location Server, MapGuide, MapQuest, TerraServer). Write a report to define distributed GIS, analyze the architecture of the 3 different systems you read, and propose a conceptual architecture of distributed GIS according to your understanding.

Homework#2: Design and develop a web-embed geographic information visualization component. GeoMedia WebMap Client or IntelliWhere OnDemand or ArcIMS must be used as a basis for developing the interactive function with users. Component must include the function of display image/vector and zoom in, zoom out, select, attribute query and hyperlink.

Homework#3: Design and develop a geographic information service system to integrate different data resources. GeoMedia WebMap Professional or IntelliWhere Location Server or ArcIMS must be used. The data resource should include ArcInfo, GeoMedia and ASCII files’ format.

Project: Design and develop a distributed GIS application system by using Intergraph software (GeoMedia WebMap Professional, IntelliWhere Location Server, IntelliWhere OnDemand) or ESRI software (ArcIMS/ArcPad) to demonstrate the function of distributed GIS (data integration, service providing, display, interaction, attribute/spatial query, and hyperlink).

Presentation: Prepare a presentation to introduce the project to your classmates: how did you design and develop it, and how could other people use it to solve one or several specific problems?

Schedule

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<tr>
<th>Date</th>
<th>Topic</th>
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<tr>
<td>Feb. 4</td>
<td>Introduce Java Language (language elements, structure, classes, Serialization, GUI controls)</td>
<td>Sun, 2002a</td>
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<tr>
<td>Feb. 11</td>
<td>Homework #1 due</td>
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<tr>
<td>Date</td>
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<td>References</td>
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<tr>
<td>Mar. 4</td>
<td>Homework#2 due</td>
<td>Brandon Plewe, 1997, Chapters.6; Terry Bossomaier, David R. Green, 2001, Chapter 4; IntelliWhere, 2002; ESRI, 2002b.</td>
</tr>
<tr>
<td>Mar.11</td>
<td>Design and Development of Client Component, GIS interactive functions (Zoom In/Out, Query, Pan, Hyperlink, Color, Patterns, etc.)</td>
<td>Terry Bossomaier, David R. Green, 2001, Chapter 3; Brandon Plewe, 1997, Chapters.5; Intergraph 2002; IntelliWhere, 2002; ESRI, 2002.</td>
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<tr>
<td>Apr. 1</td>
<td>Presentation by ESRI Specialist, Discussion/Review. Homework#3 due</td>
<td>OGC, 1998; Intergraph OGC WMS Viewer and OGC WMS Adaptor Kit</td>
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<tr>
<td>Apr. 8</td>
<td>Open system and interoperable</td>
<td>Transparencies; Articles</td>
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<tr>
<td>Apr.15</td>
<td>Agent based distributed GIS system</td>
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<tr>
<td>Apr.23</td>
<td>Final Presentation. Project due</td>
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