

Geog 5623 Spring 2006

GIS Design

T-R 10:30 AM-12 PM SEC N106

INSTRUCTOR: Dr. Tarek Rashed, SEC 680 (rashed@ou.edu; 325-5104)

OFFICE HOURS: M-W 12 – 1 PM and by appointment

OVERVIEW:

This course is oriented to those who want to learn how to develop, implement, and manage the designs of *Enterprise GIS Applications*. In contrast to typical GIS applications developed to serve a single need or purpose, an enterprise GIS is one that is designed to meet the needs of multiple users across multiple units within an organization. Typically, an enterprise GIS application is built around an integrated infrastructure of spatial database and technical framework that supports the functions of all units conducting some sort of spatial analysis in an organization. This requirement introduces many issues that are not found if a GIS is to be developed to serve a single purpose or a single unit. Among these issues are: how to maximize the integrity of database and application functions while minimizing costs; how to reduce redundancy of data layers while insuring that these layers meet the unique goals of each unit within the organization; how to provide a consistent look and feel to output, when you should provide users with customization and when not; and above all, how to implement and introduce to the organization a system with such size and complexity. In this course, students learn how to “think about GIS” (opposite to “how to do stuff with GIS”). The course will introduce students to issues related to successful planning, design and implementation of enterprise GIS applications. Throughout the course, students get in-depth perspectives and learn techniques related to planning for enterprise GIS applications, assessing organizational needs, and architecting database and systems design. Students also learn how to perform benefit-cost analysis and prepare an implementation strategy for enterprise GIS projects. Students acquire the learning objectives of this course through several means including lectures, tutorials, and a wall-to-wall hands on project to design an enterprise GIS.

PURPOSE

By completing this course, students will: (1) gain a basic theoretical and practical understanding of the design process of enterprise GIS applications; (2) be able to assess the size and scope of a system and develop a preliminary design document that addresses data and technology requirements of that system; and (3) become familiar with a host of the state-of-the-art tools and concepts in systems engineering.

PREREQUISITE:

GEOG 5453/5553 (GIS Applications or an equivalent **advanced** GIS course). Otherwise, permission from the instructor is required and will be granted based on the student’s GIS technical knowledge. Junior or senior level students wish to receive graduate credits for this course must file a petition form. Please check with the Graduate College on the deadline for such applications. The petition forms are available in the Graduate College Office, Room 313, Buchanan Hall or on the Graduate College web page at <http://gradweb.ou.edu/>

TEXT:

There is NO required text book for this class.

Highly Recommended (*but not required*): Harmon and Anderson (2003). The Design and Implementation of Geographic Information Systems. John Wiley & Sons - ISBN: 0-471-20488-9

Reference Materials: Readings for particular topics will be assigned to students as needed.

COURSE FORMAT:

This course consists of lectures, lab exercises, and student-led discussions. The lectures will be made available on **Blackboard** (ou.blackboard.com) prior to the class meeting. Lab exercises and/or tutorials will correspond to the different phases of a design project that students will work on, both on individual and group basis. Although you will have access to lab at other times, your lab period is the only time-slot during the week you are guaranteed access to the computers. **You are expected to attend all pre-scheduled labs.**

EXAMS, QUIZZES, STUDENT PRESENTATIONS and GRADUATE ESSAYS:

Three 25-30 practical quizzes (short design related exercises) will be given and will cover materials from recent lectures and project work.

Both a mid-term exam and a final exam will be held on **21 March** and **9 May** respectively and will be in form of either oral or written questions related to design project that students have been working on to the respective dates. No make-up exams without medical proofs.

Student Presentations: Students are expected to present, either on an individual or group basis, a number of project deliverables during the semester on periodic basis, exactly as what happens in real world projects.

GRADING

➤ **Uniform for both Graduate and Undergraduate students**

- Quizzes: 20%
- Project Deliverables: 40%
- Project Presentations: 10%
- Mid-term exam: 10%
- Final term exam 10%
- Class Participation: 10%

➤ **Grading scheme: A:** 90% or more, **B:** 80-89.99%, **C:** 70-79.99%, **D:** 60-60.99%, and **F:** less than 60%.

➤ **Grading Rules:**

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| <ul style="list-style-type: none">○ Grades are determined at absolute scale based on accumulative points.○ All deliverables should be submitted by the due dates. Late submission penalty is 5% per day○ No make-up exam or quiz will be allowed without a legitimate excuse such as proof of a medical condition or religious holidays. |
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IMPORTANT POLICY INFORMATION:

Academic Honesty: Academic honesty is a cornerstone of the development and acquisition of knowledge. The instructor has zero tolerance to cheating and plagiarism and will take proper actions against academic misconduct. The instructor assumes that all students are aware of all forms of academic misconduct related to plagiarism, multiple-submissions of a single paper to different classes, and any form of “collaboration” during exams. If not, you must take a moment and make sure you read and understand the OU academic conduct code (<http://www.ou.edu/studentcode/OUStudentCode.pdf>).

Integrity Pledge: OU Honor Council, which is a new initiative shared by the OU Student Association and the Office of the Provost (www.ou.edu/honorcouncil), has asked that students be asked to sign an Integrity Pledge, which reads ***"On my honor, I affirm that I have neither given nor received inappropriate aid in the completion of this exercise."*** on each single piece of work submitted, whether labs, quizzes, exams, or even a report. Any submitted work may not be accepted without signing this pledge at the end of the work. It's your responsibility as a student to make sure of this.

Students with Disabilities: Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact any of the instructors personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your education opportunities.

Religious Holidays: It is the policy of the University to excuse the absences of students that result from religious observances and to provide without penalty for the rescheduling of examinations and additional required class work that may fall on religious holidays.

SUMMARY SCHEDULE (VERY SUBJECT TO CHANGE): (Note: PW = Project Work)

	Day		Class Activity	Remarks
1	1/17	T	Syllabus/Course Introduction	
	1/19	R	<u>Getting Started I:</u> The Design Process	<i>Assigned Reading: NYSED GIS Development Guide</i>
2	1/24	T	<u>Getting Started II:</u> Needs Assessment and Requirements Analysis	
	1/26	R	<i>PW: Introduction to the Term Project and Forming Project Teams</i>	
3	1/31	T	<u>Design Essentials I:</u> Object Oriented Concepts	
	2/7	R	<u>Design Essentials II:</u> The Unified Modeling Language (UML)	
4	2/7	T	<u>Design Essentials III:</u> Use Case Modeling; Intro to MS VISIO	

	2/9	R		
			<i>PW: Develop High Level Use Cases</i>	
5	2/14	T		
	2/16	R	<u>Conceptual Modeling I</u> : Building Business Use Cases	Project Deliverable 1: High Use Case Diagrams
6	2/21	T	<u>Conceptual Modeling II</u> : Sequence and Class Diagrams	
	2/23	R	<u>Conceptual Modeling III</u> : Interface Prototyping	
7	2/28	T		PRACTICAL QUIZ1
	3/2	R		
			<i>PW: Expand Business Use Cases</i>	
8	3/7	T		
	3/9	R		
9	3/14	T		
	3/16	R		
			Spring Break -- No Classes	
10	3/21	T	Mid Term Exam (Business Use Case Presentations)	Project Deliverable 2: Business Use Case Diagrams
	3/23	R	<u>Architecting Geodatabase Design I</u> : Designing Classes and SubTypes	
11	3/28	T	<u>Architecting Geodatabase Design II</u> : Designing Attributes and Domains	
	3/30	R	<u>Architecting Geodatabase Design III</u> : Designing Relationships	
12	4/4	T	<u>Architecting Geodatabase Design IV</u> : Adding Behavior/Populating Geodatabase Schemas	
	4/6	R	<i>PW: Work on the Design of the Geodatabase Schema</i>	PRACTICAL QUIZ2
13	4/11	T		
	4/13	R	Presentations of GeoDatabase Schema	Project Deliverable 3: Geodatabase Design Schemas
14	4/18	T	<u>Architecting Systems I</u> : Customization: Changing Interfaces OR <u>Internet Mapping I</u> : Introduction to ArcIMS	
	4/20	R	<u>Architecting Systems II</u> : Customization: Working with DLLs OR <u>Internet Mapping II</u> : Creating Maps	

for ArcIMS				
15	4/25	T	<u>Architecting Systems III: System hardware & software integration issues</u> OR <u>Internet Mapping III: Building ArcIMS Websites</u>	
	4/27	R	<u>Architecting Systems IV: Benefit-Cost and Risk Analysis</u> OR <u>Internet Mapping IV: Managing ArcIMS Websites</u>	
16	5/2	T	<i>PW: Work on the Final System Design</i>	PRACTICAL QUIZ3
	5/4	R		
17	5/9	T	Final Exam (Presentations of Final System Design)	Project Deliverable 4: Final System Design
	5/11	R		

Geog 509