

Geog 4453/5453 Fall 2007
Geographic Information Systems
M-W 8:00-9:15 AM SEC N112/N106

INSTRUCTOR: **Dr. Tarek Rashed**, SEC 670 (rashed@ou.edu; 325-5104)
OFFICE HOURS: M-W 9:30:– 10:30 AM or by appointment

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OFFICE HOURS: M-W 11:00 AM – 12:00 PM or by appointment

OVERVIEW:

This course surveys the fundamental concepts, capabilities and applications of GIS technology, with emphasis on the nature of geographic data and on the issues of geographic data input, data models, spatial analysis, and data output.

PURPOSE:

By completing this course, students will: (1) Gain a basic theoretical and practical understanding of GIS concepts, technical issues, and applications; (2) Learn where GIS fits in the world of Information Systems and maps, how it is unique and why it is important; (3) Know the issues involved in obtaining and evaluating GIS data, and implementing and managing a GIS project; (4) Understand the technical language of GIS; and (5) Gain practical experience using ArcGIS™, a powerful and popular desktop GIS package.

PREREQUISITE:

There are no prerequisites but some background in computer science or geography is helpful. 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:

- 1- **Required:** Paul A. Longley, Michael F. Goodchild, David J. Maguire, David W. Rhind (2005). ISBN: 0-470-87000-1. Geographic Information Systems and Science, 2nd edition. John Wiley & Sons (The book is available at OU bookstore – used & new copies may be found on www.amazon.com).

Reference Books:

- 2- Michael Kennedy (2006). Introducing Geographic Information Systems with ArcGIS. John Wiley & Sons. ISBN 0-471-79229-2
- 3- DeMers, M. N., (2003). Fundamentals of Geographic Information Systems, 2nd edition (updated version), John Wiley & Sons - ISBN 0-471-42609-1.

COURSE FORMAT:

Lectures: This course consists of lectures and lab exercises. The lecture sessions introduce fundamentals, concepts and the recent trends in the development of GISystems and GIScience. Each topic will have materials from specified chapters in the textbook and additional references beyond the textbook. In fact, most lecture materials will be from sources outside the textbook to enrich our course under the belief that (1) students will read the textbook and learn information presented in the text book, and (2) the instructor's responsibility is to enrich the learning experiences by providing additional materials and exercises. Lecture notes will be made available via the class site at (learn.ou.edu) before the class meets.

Labs: The laboratory exercises offer hands-on practices using ArcGIS 9. ArcGIS is a powerful GIS software developed by the Environmental Systems and Research Institute Inc. (ESRI, Redlands California www.esri.com). This package is one of the most popular desktop GISs used by government organizations, private industry, and research.

Geography Microcomputer Lab (Energy Center N106) is the main facility for our computer exercises and exams. Students can use other computer laboratories on campus as long as they have access to ArcGIS software. The instructor or the TA will be available during lab sessions.

Lab is not a competition, and everyone will benefit from a cooperative attitude. Therefore, although students work individually, you are strongly encouraged to discuss the lab exercises with others in the class. 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, GROUP INVESTIGATIONS and GRADUATE ESSAY:

THREE 10 minutes quizzes (multiple-choice, fill-in blanks and/or short questions) will be given and will cover materials from recent lectures, chapters in the text book, and/or lab assignments.

Both a mid-term exam and a final exam will be held during the weeks of **October 22nd** and **December 10th** respectively and will cover materials from chapters of the text book, lectures and labs taken to the respective dates. No make-up exams without medical proofs.

Group Investigation In the second half of the semester, we will divide the class into groups of 4 or 5 students. Each group will carry out a short project in which they will apply GIS to investigate a real-world problem. The results of this investigation will be communicated to the rest of the class in two ways: (1) a power point presentation summarizing the GIS investigation and (2) a short report on the investigation conducted to be distributed to the class prior to the presentation. Each group members will then form a panel to discuss their project with the whole class. Each group will elect a group leader who will coordinate tasks of individual members and will be in charge of discussion coordination and assignments.

Specific Graduate Requirement: Those individuals enrolled in the class for graduate credits will need to choose an industry or a broader domain in which GIS has proved to be vital and will investigate and write a review paper on how GIS has been used in this industry (20-30 pages). The paper will be due on or before **12 December 2007 (11:59 PM)**. The format of the paper should conform to the requirements of the International Journal of Geographic Information Science. More information on the preparation and delivery of the paper will be communicated to students during the course.

GRADING

➤ **Geog 4453 (undergraduate credits – see also “grading rules” below):**

- Lab assignments: 45%
- Mid-term exam: 15%
- Quizzes: 10%
- Final term exam 15%
- GIS investigation (group work): 15%

➤ **Geog 5453 (graduate credits – see also “grading rules” below):**

- Lab assignments: 35%
- Mid-term exam: 12.5%
- Quizzes: 10%
- Final term exam 12.5%
- GIS Investigation (group work): 15%
- Review paper: 15%

➤ **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:**

- o Grades are determined at absolute scale based on accumulative points.
- o Lab assignments should be submitted via learn.ou.edu by the due dates. Late submission penalty is 5% per day
- o The quizzes grade is calculated based on only 3 of the 4 scheduled quizzes.
- o No make-up exam or quiz will be allowed without a legitimate excuse such as proof of a medical condition or religious holidays.
- o The GIS investigation grade will be determined as follows:
 - **Group points (max: 40 points):** 0-20 points for report & 0-20 for presentation
 - **Individual points (max: 60 points):** 0-30 points based on evaluation by fellow group members & 0-30 points based on evaluations received by the rest of the class during the panel discussion. Outliners (extreme low or high points) will be eliminated
- o For students enrolled for graduate credits, penalty of late submission of the review paper is 10 points per day.

IMPORTANT POLICY INFORMATION:

Academic Honesty: Academic honesty is a cornerstone of the development and acquisition of knowledge. The instructors have zero tolerance to cheating and plagiarism and will take proper actions against academic misconduct. The instructors assume 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 or 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 (SUBJECT TO CHANGE):

Day	Topic	Remarks
1 8/20 M	1- Syllabus/Course Introduction 2- What is a GIS? (Ch. 1, 2 & 7)	
8/22 W	Lab intro and account setup Lab 1 Introduction to ArcGIS	

2	8/27	M	<i>Representing spatial data I: Representation concepts of spatial and descriptive information (Ch. 3, 4, 8)</i>	
	8/29	W	<i>Representing spatial data I: Georeferencing (Ch. 5)</i>	
3	9/3	M	NO CLASS – LABOR DAY HOLIDAY	
	9/5	W	Lab2 Projections	<i>Lab 1 due</i>
4	9/10	M	Query Spatial Data	
	9/12	W	Lab 3: Asking questions and getting answers in GIS	<i>Lab 2 due</i>
5	9/17	M	<i>Managing GIS Data I: Data input and organization (Ch. 9, 10)</i>	<u>10 minutes Quiz (1)</u>
	9/19	W	Lab 4: Organizing, creating and editing geographic data in GIS	<i>Lab 3 due</i>
6	9/24	M	<i>Managing GIS Data II: Data editing (Ch. 10, external readings)</i>	
	9/26	W	<i>Continue working in Lab 4</i>	
7	10/1	M	Getting started with GIS Analysis - I (Ch. 14)	Final day for graduate students to provide a topic of their review paper
	10/3	W	Lab 5: Solving problems with GIS	<i>Lab 4 due</i>
8	10/8	M	Advanced GIS Analysis - II (Ch. 14)	
	10/10	W	<i>Continue working in Lab 5</i>	
9	10/15	M	Modeling in GIS (Ch. 16)	<u>10 minutes Quiz (2)</u>
	10/17	W	<i>Continue working in Lab 5</i>	
10	10/22	M	Mid Term Exam	<i>Lab 5 due</i>
	10/24	W	Working in Mid Term Exam	
11	10/29	M	Geovisualization (Ch. 12 & 13)	<i>Mid Term Exam Due</i> Introducing GIS investigation topics and assigning them to individual groups
	10/31	W	Lab 6: Designing GIS outputs	Students form group for GIS investigation

12	11/5	M	Geovisualization (Ch. 12 & 13)	
	11/7	W	<i>Continue working in Lab 6</i>	
13	11/12	M	Work in GIS investigation	<u>10 minutes Quiz (4)</u> <i>Lab 6 due</i>
	11/14	W	Work in GIS investigation	
14	11/19	M	Work in GIS investigation	
	11/21	W	NO LAB – THANKSGIVING	
15	11/26	M	Work in GIS investigation	
	11/28	W	Work in GIS investigation	
16	12/3	M	Presenting GIS investigations/Discussion	Groups submit final investigation reports
	12/5	W	Presenting GIS investigations/Discussion <u>Wrapping Up session (We meet at N112)</u>	
17	12/10	M	<i>Final Exam (Written - covering all materials)</i>	<u>Notice: day, time & location to be confirmed prior to the final exams week</u>
	12/12	W		Review paper (graduate credits) due