Geog 5623 Spring 2007

GIS Design

M 6:30 PM- 9:20 PM SEC N106

INSTRUCTOR: **Dr. Tarek Rashed**, SEC 670 (rashed@ou.edu; 325-5104)
OFFICE HOURS: M-W 1 – 2 PM and by appointment

OVERVIEW: Decision support is a well-established research and applications field concerned with developing systems to help decision makers solve problems effectively and make better decisions. Spatial decision making broadly includes any choice or alternative course of action whose consequences have geographic implications. Spatial multicriteria decision analysis is an integral part of spatial analysis applications addressing a wide range of social, economic, environmental, political, and operational problems involving multiple dimensions and conflicting values. Spatial decision support systems (SDSS) represent a comprehensive approach to spatial decision making that integrates the use of geospatial data collection, analysis, simulation, visualization, and modeling techniques used in geographical analysis, with concepts, approaches and techniques from decision management science for solving problems in geographic settings. This integration typically involves multiple geospatial and decision support technologies, including GIS, remote sensing, GPS, decision support systems, group decision support and mediation systems, machine learning, expert systems, database management systems, and data warehousing and mining.

The aim of this seminar course is to discuss and build a more coherent understanding of the fundamental concepts, methods, and tools for spatial decision making. Topics will emphasize theoretical frameworks and analytical methods at the interface of geographic information and decision support sciences, and are augmented by practical examples and hands on exercises.

PURPOSE: By completing this course, you are expected to (1) understand and be able to speculate on the nature of spatial decision problems and the interrelated concepts of geographic information and decision making, and the different elements and methods pertaining to spatial multicriteria, multiobjective decision analysis; (2) have examined a variety of GIS modeling techniques and know how to design and test an appropriate GIS-based solution model for a particular decision problem; (3) have learned and be able to articulate the principles of SDSS and the various ways in which geospatial and decision support technologies can be integrated into SDSS; (4) have carried out a review paper the critically assesses the state of SDSS application in an area of your interest, (5) have designed and implemented an elementary SDSS focusing on a specific problem; and (6) have compiled a rich set of scholarly references and web resources as a starting point for a deeper involvement in SDSS research and applications.

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.

TEXT: There is NO required text book for this class.

Highly Recommended *(but not required)* : Malczewski, J. 1999. GIS and Multicriteria Decision Analysis. J. Wiley & Sons, New York. ISBN 0-417-32944-4

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

COURSE FORMAT:

Lectures: The lectures will be made available on **D2L** (learn.ou.edu) prior to the class meeting and will include discussion items related to five core units at the interface of geographic information and decision support sciences (The Decision Support process, Modeling in GIS, Spatial Multicriteria, Multiobjective Decision Analysis, SDSS, and Case Studies). The sequence of lectures is designed to provide an incremental acquisition of knowledge from general to specific. In addition, they include overlapping topics (i.e., a concept is briefly covered in one lecture, while detailed in another) to facilitate smooth transitions between the topics and also between the concepts within an individual topic. The overlapping design also reflects a philosophy of teaching that effective learning is better achieved through rehearsals.

Labs: Rehearsals are not only facilitated through overlap in topics, but also through the hands on lab work that will cover practical examples and aim to assist you develop the technical skills necessary to carryout your final-term project. 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.**

Mid-Term Review Paper**:** To ensure a broad knowledge of the literature outside what's discussed and presented in the seminar, you will be delivering and presenting a mid-term review paper focusing on spatial decision support in a given application area (e.g., SDSS for natural resources management, SDSS for emergency operations, etc). The mid-term review paper will take **a form of a maximum of 10 page double spaced essay** that should reflect a critical assessment of literature and should draw solely on peer-reviewed publications. Papers will be assigned to a numerical grade on 0-100 point scale. Your mid-term paper will be blind-reviewed by at least two other students in the class.

Term-Project**:** In addition to the expected lab work, the practical dimension of this seminar will be further emphasized through a term-project you will carry during the second half of the semester and which will provide you with an opportunity to synthesize course information and challenge your understanding of the underlying concepts and practical details of the methods you were exposed to during the course of the seminar. You are expected to deliver and present a final term paper by the end of the seminar. The length of this double spaced paper should not exceed the 20 page limit excluding references and should conform to the quality and standards of papers published in the International Journal of Geographic Information Science. Specific instructions and format of the paper will be given to you during the course and I will work closely with you in that paper with the hope that you can do something that can be sent for publication.

Papers will be assigned to a numerical grade on 0-100 point scale and no revision allowed since the paper is due May 9th, 2007.

Participation, as expressed in the form of participating in class discussions and review of mid-term and project proposals will contribute to your grade.

GRADING: Participation 10% Lab-work: 40%; Mid-term Paper: 20%; Final-term Paper: 30%

- ***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:***

- Grades are determined at absolute scale based on accumulative points.
- The breakdown of mid-term paper is (0-15 points for submitting scope of the paper, 0-65 points for the paper, 0-20 points for presentations and class discussion)
- The breakdown of the final-term paper is (0-5 points for the concept paper, 0-15 points for the proposal, 0-5 points for proposal presentation, 0-60 points for final term paper, 0-15 points for final term presentations)
- All deliverables should be submitted by the due dates. Late submission penalty is 5% per day
- No delay in deadline is allowed without a legitimate excuse such as proof of a medical condition or religious holidays.

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).

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		Class Activity	Remarks
1	1/15	M	**No Class Martin Luther King Jr. Day**	
2	1/22	M	**Syllabus Overview** **1- Decision Support and Information Systems** Exercise 1	
3	1/29	M	**2- Decision Modeling in GIS** Exercise 2	*Exercise 1 due*
4	2/5	M	**3- Spatial Multicriteria/Multiobjective Decision Analysis-I**	*Exercise 2 due*

			Exercise 3	
5	2/12	M	**4- Spatial Multicriteria/Multiobjective Decision Analysis -II**	*** Submit 1-2 paragraphs on the scope of your mid-term paper review*
6	2/19	M	**Working in the mid-term papers** (Term paper are due Friday 3/2)	
7	2/26	M	(I will be in Germany between 2-18 and 2-27)	
8	3/5	M	**Mid-Term presentations** Follow-up lab work	*Submit your blind review of two mid-term papers*
9	3/12	M	**5- SDSS- I** Exercise 4	*Exercise 3 due* *** Submit one page concept paper on the scope of your term project*
10	3/19	M	Spring Break	
11	3/26	M	**6- SDSS –II**	
12	4/2	M	**7- SDSS –III**	*** Proposals of term-project due Thursday 4/5*
13	4/9	M	**Project proposal presentations**	*** Proposal reviews due* *Exercise 4 due*
14	4/16	M	**8- Case Studies in Spatial Decision Making**	
15	4/23	M	**Working in the term project**	
16	4/30	M		
17			**Presentation of project results**	Time and Location of the presentation to be scheduled prior to the final exams week. **Final paper due 11:59 PM, Wed 5/9**