Syllabus: GEOG 673 - GIS Modeling

Instructor

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Office Hours: Wednesdays (3:00pm-5:00pm)
(Additional office hours can be scheduled by appointment via email or phone.)

About the Course

Time: 5:30m – 8:00pm, Mondays
Location: Online (http://elms.umd.edu)

Description

This is an advanced course in spatial modeling developed specifically for students in the Master of Professional Studies, Geospatial Information Sciences program. This course is to provide foundations and understanding on various issues related to modeling and simulation in the GIScience context. It will addresses the concepts, tools, and techniques of GIS modeling, and presents modeling concepts and theory as well as provides opportunities for hands-on model design, construction, and application. The focus will be on raster-based modeling. This course is also application-orientated, particularly in these fields such as terrain modeling, LULC modeling, hydrological modeling, suitability modeling, etc.

The format of this course will consist of lectures, reading assignments, lab assignments, and a final project. The lectures will be presented via the Live Classroom on Blackboard. All lectures including the interaction between students and the instructor during the class in real-time will be archived into videos which will then be made available on the Blackboard. Please note that video archives are only intended for occasional or backup use in case students have to miss the lectures sometime due to personal, business, or medical reasons. And real-time online participation is strongly recommended. The reading and lab assignments will also be posted on the Blackboard.

Prerequisites

Students should be proficient in GIS. Students may also find it helpful to have some background in statistics, linear algebra, and computer programming.

Textbooks

There are required textbooks. However, there are a few recommended books that you might want to use. Additional reading materials (in electronic format or as links to certain web sites) will be posted on the Blackboard by the instructor.

Some useful books and articles are recommended for your reference.

1. Maguire, D., M. Batty, and M. Goodchild. 2005. *GIS, spatial analysis, and modeling*, ESRI Press (G70.212 .G584 2005)
2. Goodchild, M., B.Parke, and L.Steyaert. 1993. *Environmental Modeling with GIS*, Oxford University Press. (TD153 .E58 1993)
3. Zeiler, M. 1999, *Modeling Our World: The ESRI Guide to Geodatabase Design*. ESRI Press, Redlands, California

Assignments

There are totally five (5) lab assignments and each will count towards 13% of the final grade. The due date will be specified in the lab document. Late submission of lab reports will result in a deduction of 10 points (out of 100 in total) per day. However, in some rare situations (e.g. medical or family emergency), extension is possible if you contact the instructor before the due date.

Final Project

A final project is required to complete this course. It will provide students an opportunity to design and build a spatial database that is closely related to their study, research or work. The project must be carried out individually and independently.

The final project consists of two parts: a proposal and the actual result (i.e. a spatial database in this case). The proposal of your project must be at least two pages (single space). The proposal should: (1) identify research problem; (2) provide background information; (3) list objectives; and (4) describe methods. Specific guidelines will be provided later on. Students are encouraged to contact the instructor early during the semester to discuss potential topics and scope. This proposal will be worth 5% of your final grade while the result will account for 30%.

Grading

The plus/minus grading system will be used to assign student grades which will be determined as follows:

97-100 = A+
93-96.99 = A
90-92.99 = A-
87-89.99 = B+
83-86.99 = B
80-82.99 = B-
77-79.99 = C+
73-76.99 = C
70-72.99 = C-
67-69.99 = D+
63-66.99 = D
60-62.99 = D-
<60 = F

Minor adjustments to this scale might be made based on the performance of the class as a whole.

Software

The required software for this class is ArcGIS 9.3 (ArcInfo) which is available in the department's Open Lab or through Citrix server: http://geogwi.umd.edu/GeogCitrix/auth/login.aspx . You can log in using your UMD ID and password.

Note: The free software that comes from ESRI in books and other venues does not have the ArcInfo license and cannot be used to complete most assignments.

Course Communication

All students are required to have a GLUE account and a UMD email address. We will frequently use email for communication in the class and we will **only** use UMD email addresses. Lectures, readings, assignments, announcements, datasets, etc. will be made available via Blackboard: http://elms.umd.edu. It is your responsibility to check Blackboard and your UMD email account often so that you will get all the information sent to the class.

Rules & Policies

Attendance Policy

You are recommended but not required to attend every lecture in real-time online. We will meet online at the announced time for a live audio/video lecture. The lecture will be archived for anyone who absolutely must miss the class, but I encourage you to login at the appointed time so that you can ask questions and keep up with the course schedule.

Class Environment

In this class, students will meet in a virtual space online which will be treated as a classroom. It is important to recognize that the classroom is an environment that requires respect for all participants. Therefore, students are expected to conduct themselves in a considerate manner.

Disruptive behavior of any kind will not be tolerated. Students who are unable to show civility with one another, the teaching assistants, or myself will be subject to being referred to the Office of Student Conduct or to Campus Police. You are expected to adhere to the Code of Student Conduct.

Students with Disabilities

Any students with a disability in this class are encouraged to meet with the instructor privately during the first week of class to discuss accommodations. I will make every effort to accommodate students who are registered with the Disability Support Services (DSS) Office and who provide me with a University of Maryland DSS Accommodation form.

Religious Preference Absence

Please refer to the Online Undergraduate Catalog Policy on Religious Observance.

Academic Dishonesty

The University of Maryland, College Park, has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student, you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.shc.umd.edu.

Course Schedule

This is a tentative schedule and may be adjusted to suit our class. Changes will be announced and posted on Blackboard.

Week	Date	Lecture Topics	Readings *	Assignments **
1	Mar 2	Course Overview Introduction to GIS Modeling Demonstration and Examples	Lecture Slides	
2	Mar 9	Integration of GIS and Modeling Principles of GIS Modeling	Lecture Slides Assigned Readings	Lab 1
3	Mar 16	Spring Break		
4	Mar 23	GIS Modeling in Vector - Geoprocessing Model Builder	ESRI documentation Lecture Slides	Lab2
5	Mar 30	GIS Modeling in Raster Map Algebra Functional Operations	ESRI documentation Lecture Slides	Lab3
6	Apr 6	Terrain Modeling Hydrological Modeling Arc Hydro	Lecture Slides Assigned Readings	Lab4
7	Apr 13	Tips and Tricks of Model Builder (guest speaker from ESRI)	Lecture Slides DeMers, P35-57 ESRI document	Lab5
8	Apr 20	Suitability Modeling LULC Temporal-Spatial Change	Lecture Slides Assigned Readings	
9	Apr 27	Multi-criteria Analysis Model Optimization (guest speaker)	Assigned Readings	Project proposal due
10	May 4	Cellular Automata Models Agent-based Models 3D Modeling	Lecture Slides Assigned Readings	
11	May 11	Presentation ***		Final project due May 10

Note:

* - The assigned reading material will be posted on Blackboard in PDF format or as a link.

** - Since most of you work full-time, the best time for you to work on the lab assignments might be the weekends. Accordingly, the lab assignment will be posted on Blackboard by Friday in that week and is due the following Sunday. So, you will have two weekends (totally about 9 days) to finish it.

*** - Students may be required to attend the class in person on this date. So, you might want to mark your calendar early. However, it is also likely we will do the presentations online if we can find a technical solution with Blackboard. You will be notified before the end of this semester.