Syllabus: GEOG654 - GIS and Spatial Modeling - Fall 2013

Instructor
Dr. Jonathan P. Resop (resop@umd.edu)
Office Hours: Online: Tuesdays 8:30 to 9:30 pm; On-campus: Mondays 4 to 5 pm
Location: 2178 LaFrak Hall
Teaching Assistant
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Office Hours: <TBD>
About the Course
Time: 5:30 to 8:00 pm Wednesdays (Lectures); 5:30 to 7:00 pm Thursdays (Lab Sessions)
Location: Online: http://elms.umd.edu; Campus Location: 1220 LaFrak Hall (Lectures)

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 GIS context. It will address the concepts, tools, and techniques of GIS modeling. In addition, it will present modeling concepts and theory as well as provide opportunities for hands-on model design, construction, and application. The focus will be on raster-based modeling. This course is application-orientated, particularly in fields such as terrain modeling, land use land cover change modeling, hydrological modeling, suitability modeling, etc.

The format of this course will consist of lectures, lab assignments, readings, and a final project. The lectures will be presented online via the Live Classroom on the Enterprise Learning Management System (ELMS). All lectures involve the interaction between students and instructor in real-time. Lectures will be archived into videos which will be made available on ELMS. Please note that video archives are only intended for occasional or backup use in case students have to miss lectures due to personal, business, or medical reasons. Real-time, online participation is strongly recommended. The reading and lab assignments will also be posted on ELMS.

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 no 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 ELMS 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. 2010. *Modeling Our World: The ESRI Guide to Geodatabase Design*. Second Ed. ESRI Press, Redlands, California

Assignments
There are a total of seven (7) lab assignments and each will count towards 10% 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 implement a spatial model 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 a final report (i.e. a poster and presentation). The proposal of your project must be two pages (single space). The proposal should: (1) identify the research problem; (2) provide background information; (3) list the objectives; and (4) describe the methodology. 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 (poster) will account for 20%.

Grading
The distributions of grade are:
Lab Assignments = 70%
Final Project = 25% (Proposal = 5% and Poster = 20%)
Presentation / Discussion / Participation = 5 %
Weekly Quizzes = 0% (Not Graded, but count towards participation)
The plus/minus grading system will be used to assign student grades. Minor adjustments to this scale might be made based on the performance of the class as a whole.

Hardware and Software
You can use either a PC or Mac to access ELMS. Whichever you choose, it must be equipped with a webcam and headset (headphones and microphone). You should also have the following plug-ins installed: Real Media, Flash Player, and Quicktime.

The software required for this class is ESRI ArcGIS 10.1 (ArcInfo) which is available in the open lab (located in 1136 and 1138 LeFrak Hall) or on the Citrix server (http://geogwi.umd.edu/). Note: The free software that comes in books and other venues does not have the ArcInfo license and cannot be used to complete most labs.

Communication and Support
Email
Both the TA and the instructor will always be available by email. Use the email link in the sidebar to send us an email at any time. We will try to answer within 24 hours and usually sooner.

Online / Chatroom Office Hours
I will have office hours in a Life Classroom / chatroom each week. Use the link in the sidebar to access office hours. The times will be posted in the Announcements section.

Offline / On-campus Office Hours
I will be available to meet on campus for face-to-face office hours at specified times. You can also email either the TA or the instructor to set up individual office hours by appointment.

Discussion Board
The discussion board is a place on the ELMS site for you to visit your classmates. This is an open forum for discussion about course material and for casual conversation. We encourage any general questions about the course material or lab assignments to be posted here so that students can help learn from each other. We will try to help answer any course-related questions that are posted here. In addition, there will be study rooms set up for you to form study groups. We will not be monitoring these rooms. Remember

that the University Code of Academic Integrity specifies that you are free to work together and to discuss the assignments, but that you must produce your own original and independent work.

Class Attendance and Environment
You are strongly recommended to attend every lecture in real time at the online site. We will meet online at the announced time for a live audio/video lecture. During this time you can follow along with the lecture and ask any questions that you may have. The lecture will be archived for anyone who absolutely must miss a class, but I encourage you to join the class online at the appointed time so that you can ask questions and keep up with the course schedule.

In this class, students will meet in a virtual space online which will be treated as a classroom. Our class will meet within the Enterprise Learning Management System (ELMS), the university's online learning system. Go to http://elms.umd.edu to access the course. After login, the course will be listed in the right column under "My Courses".

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.

Disabilities and Religion
Any student with a disability is 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 provide a DSS accommodation form.

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

Academic Integrity
The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets the 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.

Within our class, students may work together to review class notes and lab assignments. However, labs must be done individually. Students must turn in their own work without assistance from another student.

Course Schedule
This is a tentative schedule and may be adjusted. Changes will be announced and posted on ELMS.

Week	Date	Lecture Topics	Readings	Assignments
1	Sept. 4	Course Overview Introduction to Modeling	(Turner, 2001)	Lab 1 Out
2	Sept. 11	Spatial Modeling GIS / Model Integration	(Goodchild, 2005) (Resop, 2012)	Lab 1 Due Lab 2 Out
3	Sept. 18	GIS Modeling in Vector Regression Analysis	(Pearsall, 2012) ESRI - Regression	Lab 2 Due Lab 3 Out Proposal Out
4	Sept. 25	Geoprocessing Model Builder Evaluation and Validation	(Moriasi, 2007) (Kok, 2001) ESRI - Geoprocessing	Lab 3 Due
5	Oct. 2	GIS Modeling in Raster Map Algebra	(Resop, 2011) ESRI - Map Algebra	Proposal Due Lab 4 Out
6	Oct. 9	Terrain Modeling Hydrological Modeling	(Mitas, 1999) ESRI - Interpolation	Lab 4 Due Lab 5 Out
7	Oct. 16	Suitability Modeling LULC Temporal-Spatial Change Sensitivity Analysis	(Erdogan, 2007) (Chen, 2010) ESRI - Weighted Overlay	Lab 5 Due Lab 6 Out
8	Oct. 23	Cellular Automata Models Agent-based Models Uncertainty Analysis	(Brown, 2007) (Hession, 1996) NetLogo - Manual	Lab 6 Due Lab 7 Out
9	Oct. 30	3D Visualization and Modeling Climate Models	(Auffhammer, 2011) IPCC - Climate Models	Lab 7 Due
10	Nov. 6	Final Project Presentations Additional Topics		Project due *

* Presentations will be during the last lecture of class. Final Projects will be due before Nov. 10.

Note: Lab assignments are handed out after class and are due before the start of the next class.