GEOG 479 / 579  Geographic Information Analysis

COURSE SYLLABUS  Spring Quarter, 2011

Lecture:  Mon/Wed @  1:10 pm – 3:00 pm  
Lab:  Fri @ 11:10 pm – 1:00 pm

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Office Hours:  Mon/Wed @ 12:00 pm – 1:00 pm  
(and by appointment)

Teaching Assistant:  Heather Dewalt
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Office Hours:  Tue @ 3 pm – 5 pm  
(and by appointment)

Course Content
This course is designed to foster spatial analysis skills in students. The course assumes that students have a basic understanding of statistics and GIS. In this advanced course, the goal will be to understand the special mathematical techniques devised for analyzing different kinds of geographic data. The role of uncertainty in spatial decision making will be a constant theme in all discussions and lab exercises. The course will begin with an introduction to digital terrain analysis. Students will learn to analyze and process DEMs to derive quantitative geomorphometric parameters, identify topological primitives for describing terrain shape, and implement drainage network and watershed segmentation algorithms. The second topic will be multi-criteria analysis so that students can get introduced to some traditional spatial decision making frameworks. The remainder of the course will focus exclusively on spatial statistics. Post mid-term, the course discussions will focus on the variety of exploratory spatial statistical methods for detecting and quantifying spatial patterns. Global and local spatial autocorrelation statistics, nearest neighbor statistics, and point pattern analysis will be discussed. This will be followed by corresponding areal and line statistics measures. Finally, spatial interpolation techniques such as Voronoi tessellation, spatial regression, inverse distance weighing, variogram analysis, kriging, and spline techniques will be discussed and compared to each other. Time permitting, students may also be introduced to spatial regression and geographically weighted regression principles. This course will also expose students to a variety of software tools such as ArcGIS Spatial Analyst, ArcGIS Geostatistical Analyst, ArcGIS Spatial Statistics, GRASS, Benthic Modeler, Landserf, and ILWIS.

Pre-Requisite Courses
GEOG 271 – Introduction to Statistics in Geography (or at least one course in Statistics)
GEOG 478/578 – Principles of GIS
Instruction Material

There is no prescribed text book for the class, although several books will be introduced during this class. Class lectures and lab exercise material will be the basis for lab exercises and exams. Students will be working in groups. Attending classes together is, therefore, highly encouraged. The PowerPoint slides used for lectures will be made available regularly. Lecture material will be based on several text books, articles, journal publications, and the instructor’s research and professional background in application and development of GIS principles and software.

Grading (5 credits)

The lectures and lab exercises will be considered together for grading purposes. All lecture, class discussions, assigned readings, student presentations, lab exercises, and relevant book chapters will define the scope of quizzes and exams. There will be a mid-term and a final exam, both of which will be conducted based on the ‘open book’ philosophy – i.e., students can bring their notes and can access the computer during exams. A make up exam may be given (but is not guaranteed) when a student contacts the instructor either before the commencement of the scheduled examination with an acceptable excuse (such as illness, school sponsored activity etc.). In the case of serious illness or accident, a medical certificate from a physician will be required. There will be no lab exam. Students will be expected to show motivation and write a paper based on each lab to summarize lessons learned. The lab reports, software competency, and demonstration of analytical skills will determine 60% of the final grade. The following is the grading strategy and schedule that will be used to determine the final grade for each student.

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<th>Grade</th>
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*No automatic incomplete grade will be given.

Class Participation & Attendance

Attendance and participation in class discussions will be expected and strongly encouraged. Since the course relies heavily on in-class demonstrations and project work, punctuality and attendance is critical. If any topic is unclear after lecture, please do not hesitate to see me as soon as possible. You will be held responsible for all material covered in class and deductions may be imposed for projects turned in late. If you do miss class, you should make every effort to contact me before the next class so you can catch up on missed material. No extra credit is available and all projects and final exam must be completed. Students will work in groups; hence it is also critical to work closely and coordinate work schedule with the group partner(s).
Academic Integrity

Students are expected to abide by the Ohio University Student Code of Conduct. Depending on the nature of the violation, the instructor’s response may range from imposing grade penalty to assigning an automatic failure grade. Students will be reported to the respective advisor and appropriate school authorities in case of academic misconduct and/or misdemeanor in class.

Other Instructions

The course will utilize Blackboard only partially for some postings. All lecture and lab material will be made available only on the local network drive allocated for the class. Please check your O.U. email regularly as that will be the preferred system of communication. Also note that this course, especially the lab exercises, are extremely time intensive. Please allocate sufficient time to work on labs beyond the officially allocated hours.

Institutional Equality

In compliance with the Americans with Disabilities Act (ADA), all students who have a document disability are entitled to “reasonable academic accommodations.” If you are a student with special needs, it is your responsibility to be registered with the Institutional Equity representative at Student Services. In addition, you need to inform your instructor each quarter before the end of the second week of class.