GEO 428 (fall 2010): Digital Terrain Analysis (4 Cr.)
http://www.msu.edu/~ashton/classes/428

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Office Hours: Monday & Thursday 2 – 4 pm, or by appointment. No drop-ins, please.

Time and Place
Tuesday / Thursday 12:40 – 2 pm, 201 Geography
Tuesday, 2:10 - 4:00 pm, 201 Geography (Lab)
Final Exam Slot: Thursday, December 13, 12:45-2:45 pm (201 Geography)

Course Objectives
This course covers a range of issues relating to digital terrain, from conception to generation to processing and analysis to visualization. We will build digital elevation models ourselves, and we will learn where and how to obtain existing data. We will consider many important factors of data modeling, including spatial resolution and alternative data structures. The bulk of the course will be devoted to analysis using digital elevation data:
  • surface derivatives, including slope, aspect, and drainage
  • environmental modeling with elevation data
  • impact of resolution, error and uncertainty on results

This is a hands-on lab course, and you will use a variety of software tools to experience terrain model development, analysis, and visualization for yourself. There will be a semester project and a number of mini-projects we will work on in lab, along with exams on the classroom content.

Grades
Undergraduate Students
30% Three Midterm Exams (10% each)
40% Lab Reports
25% Project
5% Class Participation

Graduate Students
24% Three Midterm Exams (8% each)
36% Lab Reports
25% Project
5% Class Participation

Scale
93 - 100: 4.0
86 - 92: 3.5
79 - 85: 3.0
72 - 78: 2.5
65 - 71: 2.0
58 - 64: 1.5
51 - 57: 1.0
0 - 50: 0.0

If exam or lab report scores are very low I may institute a curve; if so, it will be clearly explained so that you understand its effect on your grade.
Lab Reports
The first three lab reports involve surveying and modeling topography. These are group reports on work done jointly in teams of about 3. About 8 more lab reports are based on handouts provided to you in the computer lab. All lab reports must be typed (printed), using clear and correct grammar and syntax. The report must cover the questions and concepts required, and present them in a logical, organized fashion. An example lab report is available on-line.

Final Project
The final project is a group project with 2 or possibly 3 members. All members of the group get the same grade. The goal of the project is to answer a research question using the tools and methods covered in the course. Project output consists of a research preproposal, a full proposal, a presentation, and a report. Dates and weights are given in the following table:

<table>
<thead>
<tr>
<th></th>
<th>Due Date</th>
<th>% of Project Grade</th>
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<tbody>
<tr>
<td>Preproposal</td>
<td>Friday Nov 9, 5pm</td>
<td>4%</td>
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<tr>
<td>Full Proposal</td>
<td>Wednesday, Nov 21, 5pm</td>
<td>20%</td>
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<tr>
<td>Presentation</td>
<td>Thursday, Dec. 6, in class</td>
<td>40%</td>
</tr>
<tr>
<td>Report</td>
<td>Thursday, Dec. 13, 5 pm</td>
<td>36%</td>
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Graduate Paper
Graduate students will write a concise, well-organized paper on a particular scientific application of digital terrain models in a subfield of their choosing. This is a review paper rather than a research report. A short (½ page) description of the chosen topic, along with an annotated bibliography of 5-10 papers, is due on Friday, Nov. 16, and the final paper is due on Friday, Dec. 7.

Academic Dishonesty
Plagiarism is the use of others’ ideas without identifying the source. It is a serious academic offense, and Michigan State University has clear policies on this. If I find evidence of plagiarism, improperly attributed group work, or cheating on an exam, I have the responsibility to issue a failing grade on the assignment or for the course, and report the conduct to University authorities. For more, see: http://grad.msu.edu/researchintegrity/resources/plagiarism.aspx

Makeup Policy
In general, deadlines are firm. Late work will not be graded. Doctor’s note or other highly convincing written evidence may be acceptable. Makeup exam will be as soon as possible after the scheduled exam. The university has made incomplete grades extremely difficult; count on earning your points during the semester.

Books / Readings
There is no required textbook for this course. Material will be provided on-line and in class. An outline of lecture notes will also be available on-line before class; these are not a substitute for showing up to lecture! Students who do not attend lecture or lab will fail!

A tremendous amount of academic and applied literature exists on digital terrain analysis. Most are journal articles, but here are a few books if you wish to refer to one: