Geography 4103
Introduction to Geographic Information Science

http://www.colorado.edu/geography/class_homepages/geog_4103_s14

Lectures Tues/Thurs 12:30 -1:45 GUGG 205
Labs Tues 3:30-6:20; Wed 11-1:50 KESDA Lab (Gugg 6)

Instructor: Chris Anderson-Tarver
Guggenheim 201 F
anderscn@colorado.edu
Office hours: Tues 11:30am-12:30 pm and Thurs 1:45-2:45pm

TA: Mehran Ghandehari
Guggenheim 301B
mehran.ghandehari@colorado.edu
Office hours: Wed 4-5; Fri 2-3 in KESDA

Undergraduate lab assistants: Hannah Smith, Molly Graber, and Anthony Meluso

OVERVIEW: This course introduces concepts and use of Geographic Information Systems to analyze geospatial data. Emphasis is placed on the nature of geographic information, management of geospatial data, and how digital methods support geographic analysis and modeling. The course is intended for students who want a technical introduction to GISystems and GIScience. You’ll learn how to import spatial data into a GIS database, how to organize data to detect and analyze spatial patterns, and basic skills for GIS query and map overlay. You’ll work with mapping in a GIS environment. Lectures will introduce the conceptual and computational basis for GIScience. Lab exercises will give you lots of hands-on experience with GIS methods and data.

PREREQUISITES: A technical course in mapping skills (GEOG 3053) and a course in Introductory Statistics. I assume that you are comfortable with Windows, email and Internet, have basic experience with maps and charts, and have a basic understanding of map scale, map projections, and interpreting spatial patterns. I also assume you understand elementary descriptive statistics such as correlation, means, medians and quartiles, variance and residuals.

LECTURES: Lecture periods emphasize concepts, in-class discussions, and student participation. Some lectures will present case studies related to specific lab assignments; in others you will work on short in-class exercises, join small group problem-solving, or participate in class discussions on readings. Our goal is to synchronize lectures with labs as much as possible.

LABS: Labs meet every week including the first week of classes. Lab assignments are due at the beginning of lab session, except for exercises marked in the schedule. Late lab assignments will be docked 20% per day, beginning on the due date. Students must hand in all lab assignments by noon Monday 4 May 2015 to receive a passing grade, including any late lab assignments.

Students are required to back up their own data and assignments; we do not have reliable backup facilities available in KESDA. Purchase at least two flash drives (min 2GB) and dedicate them to this class – use one for backup. We’ll show you how to use the flash drive to hand in assignments.

ATTENDANCE: Attendance will be taken at lecture; more than four unexcused absences during the term will lose four per cent off the final course grade for each missed class. An excused absence from lecture means written permission beforehand from chris.

Attendance is also required in labs. You must attend full lab periods to pass the class: you can’t learn GIS if you don’t do GIS. Four per cent will be taken off your final course grade for each missed lab, unless you have written permission in advance from chris or the TA. We collect and archive all permission emails.

READINGS:
Additional required readings will be available as pdf documents on the class website.

**GRADING:** The class grade is based on 320 points
- Lab Exercises (10) - 160 points
- Quizzes (3) - 60 points
- Readings abstracts (2 abstracts each from 3 sets) - 30 points
- In-Class exercises (5) - 40 points
- Readings Discussion (1) - 20 points
- Ask Questions in Class - 10 points

**READINGS ABSTRACTS:** Students will submit three pairs of readings abstract assignments, writing two abstracts for each assignment (6 in all). Each abstract should be 200 words plus one question (that means 400 words plus two questions for each assignment), in Word (.doc or .docx) format. Abstracts must include a full citation for each article, using the format shown in this syllabus. A template for abstracts can be found on the class website. Hand the abstracts in a single Word document by email to chris before class on the due dates. Late abstracts will not be accepted.

**READINGS DISCUSSIONS:** Several times during the semester, the class will devote half a lecture period to discussing readings. Students will work in groups to lead a readings discussion, preparing a Powerpoint presentation to be posted on the class website. Each member of the group will present the topic to the class and lead the discussion (max 30 min). Optionally, each group team can meet with chris before their readings discussion for feedback on the material they are going to use. Additional instructions are available on the class website. Students who are not presenting on a given topic are expected to prepare for discussion periods by reading the assigned articles, and contribute questions and discussion.

**Readings Abstracts**

- **29 Jan** Scale and Resolution in GIS: Tobler, Mandelbrot 1 and 2, Goodchild and Proctor, Shelberg et al
- **3 Feb** Readings Discussion in Class
- **5 March** Topology: Wissler, Theobald, Buttenfield
- **10 March** Readings Discussion in Class
- **31 March** GIS Applications in Natural and Social Sciences: Bibby & Shepherd, Aspinal
- **2 April** Readings Discussion in Class
- **9 April** Accuracy and Uncertainty: Beard, Comber et al, Fisher PF
- **14 April** Readings Discussion in Class
- **21 April** Geoslavery and Location Services: Dobson and Fisher, Honan, Klinkenberg, Fisher A.
- **23 April** Readings Discussion in Class

**Please Note:** I do not give make-up class exercises. Please turn off cell phones during class and labs.
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<thead>
<tr>
<th>DATE</th>
<th>LECTURE</th>
<th>READING</th>
<th>LAB EXERCISE</th>
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<tbody>
<tr>
<td>1 13 J</td>
<td>Introduction, GIS Components</td>
<td>Bolstad 1, 4(131-140,164-170); Goodchild</td>
<td>Lab 0 – KESDA intro and ArcGIS Tour</td>
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<td>2 20 J</td>
<td>Case Study - Roadsalt Model, The Nature of Spatial Data</td>
<td>Tobler, Mandelbrot- both Goodchild &amp; Proctor</td>
<td>Lab 1 – Modeling Timber Due 27/28 J (15)</td>
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<td>3 27 J</td>
<td>Spatial Resolution</td>
<td>Shelberg Bolstad 4(159-161), 5, 6</td>
<td>Lab 2 – Vector /Raster Query Due 10/11 F (15)</td>
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<td>4 3 F</td>
<td>Raster and Vector Data 1 Run-Length Ex (5)</td>
<td>Bolstad 2,11</td>
<td>Lab 2 (con’t.)</td>
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<td>10 F</td>
<td>Quiz #1: GIS Components, Scale, GPS (20)</td>
<td>Sinton</td>
<td>Lab 3 GIS Scenarios Due 17/18 F (15)</td>
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<td>6 17 F</td>
<td>Projections 1, 2</td>
<td>UTM-SPC Bolstad 3, App. B</td>
<td>Lab 4 Projections Due Fri 24/25 F (10)</td>
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<td>7 24 F</td>
<td>Cartographic Modeling</td>
<td>Bolstad 13 (521-528) Wissler; Theobald, Buttonfield</td>
<td>Lab 5 ModelBuilder Due Fri 3/4 M (10)</td>
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<td>Feature Geometry 1</td>
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<td>8 3 M</td>
<td>Feature Geometry 2 Spatial Topology</td>
<td>Rdg abs #2 due 5 M (10)</td>
<td>Lab 6 Scenario Building Due 17/18 M (20)</td>
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<td>9 10 M</td>
<td>GIS Attributes 1, 2</td>
<td>Bolstad 9, 10</td>
<td>Lab 6 (con’t.) GPS Data Collection Day</td>
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<td>10 17 M</td>
<td>GIS Attributes 2 Modeling Operators Ex (8) Quiz #2: features, attributes, topology, projections, Sinton Modeling (20)</td>
<td>NY Times Bolstad 7; Bibby; Aspinal</td>
<td>Lab 7 GPS and Topology Due 31M/1A (15)</td>
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<td>11 23 Mar</td>
<td>SPRING BREAK – NO CLASSES</td>
<td>NO LABS THIS WEEK</td>
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<td>12 31 M</td>
<td>Case Study - Deer Online Data Sources</td>
<td>Bolstad 4 (171-175), 14 Beard; Comber; Fisher PF</td>
<td>Lab 8 Greenspace Modeling Due 7/8 A (20)</td>
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<td>13 7 A</td>
<td>Data Uncertainty &amp; Metadata GIS Database Management 1</td>
<td>Bolstad 8 Rdg abs #4 due 9 A (10)</td>
<td>Lab 9 Coastal Flooding Due 21/22 A (20)</td>
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<td>14 14 A</td>
<td>GIS Database Management 2 Relational Database Ex (9)</td>
<td>Dobson&amp;Fisher; Honan; Klinkenberg, Fisher A</td>
<td>Lab 9 (con’t.)</td>
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<td>15 21 A</td>
<td>Case Study – Envir Justice</td>
<td>Mennis&amp;Jordan Rdg abs #5 due 21 A (10)</td>
<td>Lab 10 Envir Justice Due Mon 4 May noon (20)</td>
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<td>16 28 A</td>
<td>Quiz #3: DBMS, GIS apps, uncertainty, geoslavery (20) Class Summary: Other GIS classes, other prospects</td>
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<td>Lab 10 (con’t.) All labs due Mon 4 May noon</td>
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**Xerox Readings**
*(available as pdfs on class website and some are on the web-at-large)*


New York Times 5 articles (Case Study #2): Deer in Buffalo NY; Pittsburgh PA; Princeton NJ; Front Royal VA; Cougar and Deer in Boulder CO


Department of Geography Code of Conduct

In the Department of Geography, instructors strive to create an atmosphere of mutual trust and respect in which learning, debate, and intellectual growth can thrive. Creating this atmosphere requires that instructors and students work to achieve a classroom in which learning is not disrupted. At the most basic level, this means that everyone attend class, be prepared with readings and assignments completed, and that students pay attention. This means no conversations with friends, reading the newspaper, coming late, or leaving early without good reason. Such behavior is disruptive to the instructor and to your fellow classmates.

These basics of classroom etiquette are an important means of building and showing mutual respect. However, disagreements may arise. Sometimes these disagreements will be about content, sometimes about grades or course procedures, and sometimes about the treatment of participants in the class. In order to facilitate the resolution of disagreements if they do arise, the following guidelines should be followed by everyone:

- All interactions must be guided by mutual respect and trust.
- If you are bothered by some aspect of the class, identify what bothers you and center the discussion on that issue.
- Address issues that concern you early. Problems are easier to resolve before they fester.
- Consider whether it is best to address your concerns in class or in a separate appointment with the instructor. Remember, behavior that disrupts your fellow classmates is not acceptable.
- Abusive speech or behavior will not be tolerated in any interaction between students or between student and instructor. If an instructor feels that your speech or behavior is abusive, you will be asked to leave the room. If you believe an instructor has become abusive, you may leave the room and talk with the department chairperson. Debate and discussion can continue when all parties proceed with mutual respect.
- If mutual respect cannot be restored, either you or the instructor may take the issue to the department chairperson or the Campus Ombuds Office [http://www.colorado.edu/ombuds/].

Policy on Plagiarism

The College of Arts and Sciences has an Honor Code that prohibits plagiarism, cheating, fabrication, aiding academic dishonesty, lying, bribery, and threats at the University of Colorado. A key element of this code is that CU students will not plagiarize which means you may not use someone else’s words, pictures, ideas, or procedures as your own. In some instances, it is appropriate to do so when you provide proper acknowledgement. Cases of plagiarism and violations of the CU Honor Code will not be tolerated. More information can be found online at [http://www.colorado.edu/academics/honorcode/], particularly under the “Student Information, What is a Violation?” section.

Policy on Students with Disabilities

If you qualify for accommodations because of a disability, please submit to your instructor a letter from Disability Services in a timely manner (preferably the first two weeks of the semester) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact:303-492-8671, Center4Community N200, [www.colorado.edu/disabilityservices]. If you have a temporary medical condition or injury, or if you are sick (flu, etc.), contact your instructor as early as possible; I and the TA will do our best to make reasonable accommodations, extensions on assignments, additional time on exams, etc.

Religious Holidays
Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Talk to your instructor at the beginning of the semester. Full details of the campus-wide policy are at http://www.colorado.edu/policies/fac_relig.html.
QUESTIONNAIRE

NAME_________________________________    YEAR _________

MAJOR______________________    CONCENTRATION  _________________

WHAT OTHER COURSEWORK have you taken related to Cartography / GIS or Environmental Modeling? (map use, map making, remote sensing, landscape architecture, surveying, environmental design, civil engineering, planning, mathematics, computer science, environmental studies)

1. ___________________________  2. ___________________________

3. ___________________________  4. ___________________________

WHAT DO YOU EXPECT TO LEARN BY TAKING THIS COURSE?

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

WHAT CONCERNS DO YOU HAVE ABOUT TAKING THIS COURSE?

____________________________________________________________________________________

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____________________________________________________________________________________

Thanks for filling this out. Your answers will help me to understand who's out there...