GEOG 4110/5100: SPECIAL TOPICS IN GEOGRAPHY
GIS IN THE SOCIAL AND NATURAL SCIENCES

DATES, TIME & LOCATION:
May 15 – June 02, 2017; Mon-Fri 9am-12pm in KESDAL, Geography Building (Guggenheim)

INSTRUCTOR:
Stefan Leyk Office: Guggenheim 201 F
Voice: 303-492-4695 E-mail: stefan.leyk@colorado.edu

OVERVIEW:
This course is designed as an introductory class to Geographic Information Systems (GIS) suitable for students
(graduate and undergraduate students) from Geography, Environmental Sciences, Geology, Ecology/Biology,
Anthropology, Economy, Education or Sociology who are interested in learning about GIS tools and their
underlying principles and how to apply GIS to analytical and mapping-related tasks.

Students can use this class as a spring board to enter the GIScience curriculum in Geography or as a quick intro to
get basic skills for working in a GIS environment. I will introduce basic theoretical and practical elements of GIS
and GIScience that are important to get started on a GIS project, handling and managing geospatial data, creating
maps and conducting GIS analysis. Students will work in ArcGIS (and see some QGIS) software on tasks
typically encountered in the social and natural sciences.

We will meet in the KESDA computer lab in the Geography building. The format of class meetings will alternate
between lecture/demo/in-class exercise components and computer exercises. This way concepts discussed in
lecture will be directly put in practice to better understand underlying mechanics, results, problems and important
implications resulting from decisions made based on such results.

The class website can be found here: http://www.colorado.edu/geography/leyk/geog_4110_5100/Overview.html

PREREQUISITES:
Familiarity with file management tasks in Windows, confidence in working with software tools. Students are
encouraged to set up their own laptops with software provided (ArcGIS with student licenses).

LECTURES:
Lecture parts emphasize concepts and provide some case studies. Demos and exercises will include practical
examples related to the topic of the day and provide room for discussion. Please turn off your cell phone during
class. Students are required to back up their own data and assignments; we do not have backup facilities for this
class (but you can use your CU online resources of course). Purchase at least one 6 GB flash drive and dedicate it
to this class. Part of the class meetings will be used for student short presentations (see below).

READINGS:
additional readings will be provided
ESRI’s ArcGIS Help 10.3 Online: http://desktop.arcgis.com/en/documentation/

EXERCISES & ASSIGNMENTS:
You will complete a set of exercises and submit for 5 of these final maps. An exercise is computer work based on
instructions (interactive but with increasing level of independence as we go).

You will also complete two independent assignments and turn in for each of them a short written response letter
explaining and interpreting your results and a map created based on the results.

Short presentations: Each student will give TWO brief presentations in front of the class (max 10min including
questions) on his/her work done during the exercise/assignment the day before; you will discuss problems
encountered, interpret the results using the GIS data layers and the map project as well as the final map created
during the exercise or assignment. You can sign up for any exercise (indicated with an “(M)” or assignment
“(A)” from May 17 to June 01. A maximum of 6 presentations per day is allowed. First come, first serve.
GRADING:
The class grade is based on **170 points** in total.

- Two submitted **independent assignments ("(A)")** (GIS work; **80 points** in total, 40 points each) each of which includes presentation of results in tabular or graphic form (5 points), a short response letter to a “customer” for whom you carried out the described work and created the final map. The letter needs to briefly describe and interpret the results and answer questions asked in the assignment (15 points), and include a final map (20 points)
- Five Submitted **maps** created during class exercises (“(M)”) (total of **50 points**, 10 points each)
- Two short presentation of exercise/assignment results in front of the class (**30 points**, 15 points each)
- Class participation and attendance (**10 points**)

**Note:** Make-up tests/presentations will be given only for documented medical emergencies! No incompletes!

SCHEDULE FOR GEOG 4110-001 / 5100-001, MAY 15-JUNE 02, 2017

<table>
<thead>
<tr>
<th>May</th>
<th>Lecture</th>
<th>Points</th>
<th>Reading (B#: Bolstad Ch.)</th>
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| 15   | Class 01: Introduction  
*Exercise 01: Getting Started (ArcGIS tour)* | | B1 |
| 16   | Class 02: What is a GIS?  
*Exercise 02: Spatial Data & Creating Maps*  
Discussion: Creating, Presenting & Interpreting Maps | | B1; ESRI |
| 17   | Class 03: What do Spatial Data Represent? & Data Structure  
*Exercise 03: Work with Data Frames (M1)*  
Discussion: Communicating with Maps and Spatial Information | 10 | B2 (29-39); B4 (147-55); ESRI |
| 18   | Class 04: Understanding Cartographic Scale & Spatial Resolution  
*Presentations M1*  
*Exercise 04: Geodatabases (M2)* | 10 | Tobler, Goodchild & Protor; ESRI |
| 19   | Class 05: Projections and Coordinate Systems  
*Presentations M2*  
Interactive: UUC; Discussion: Project design and management | | B3 (85-115); ESRI |
| 22   | Class 06: Vector Data in a GIS Environment  
*Presentations M3*  
*Exercise 05: Editing & Digitizing (M3)*  
Interactive: Distance; Discussion: Independent Assignments | 10 | |
| 23   | Class 07a: Working with Vector Data in a GIS 1  
*Presentations A1*  
*Exercise 06: Tables & Attributes Calculations*  
Discussion: How to respond to customer inquiries.  
*Exercise 07: Table Join & Spatial Queries (M4)* | 40 | B2 (40-53; 63-68; 420-425) |
| 24   | Class 07b: Working with Vector Data in a GIS 2  
*Presentations M4*  
*Exercise 08: Buffering & Overlay* | 10 | B9 (373-398); ESRI |
| 29   | Campus closed (Memorial Day) | | |
| 30   | Class 08: Raster Data in a GIS Environment  
*Presentations A2*  
*Exercise 09: Raster Data & Raster Analysis (M5)*  
Discussion and Demos in a Raster Environment  
*Exercise 09: Raster Data & Raster Analysis* | 40 | B2 (54-60; 69-84), B4(180-182) |
| 31   | Class 09a: Working with Raster Data in a GIS 1  
Discussion and Demos in a Raster Environment | | B10 (443-60) |
| J01  | Class 09b: Working with Raster Data in a GIS 2  
*Presentations M5*  
*Exercise 09: Raster Data & Raster Analysis (M5)* | 10 | B10 (460-82) |
| 02   | Class 10: A Quick Look at Remote Sensing  
Review, Final Discussion & Outlook | | B6 (249-296) |

**Exercises:** Computer Work with instructions (increasing independence as we go); an exercise marked with an “(M#)” means that a final map has to be submitted; **Assignments (A#):** Independent lab assignment, solving a given task and writing a short interpretative essay.
Disability
If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with your professor.

Religious observances
Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please let the instructor know about such conflicts as soon as you studied the schedule for this semester in particular the exam dates.

Policy on Classroom Behavior
Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at http://www.colorado.edu/policies/classbehavior.html and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

Policy on Discrimination and Harassment
The University of Colorado Boulder (CU-Boulder) is committed to maintaining a positive learning, working, and living environment. The University of Colorado does not discriminate on the basis of race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status in admission and access to, and treatment and employment in, its educational programs and activities. (Regent Law, Article 10, amended 11/8/2001). CU-Boulder will not tolerate acts of discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this CU-Boulder policy, "Protected Classes" refers to race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, or veteran status. Individuals who believe they have been discriminated against should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at http://www.colorado.edu/odh

Policy on Plagiarism
All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at http://www.colorado.edu/policies/honor.html and at http://www.colorado.edu/academics/honorcode/

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. 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. Inevitably, however, disagreements will arise. Sometimes these disagreements will be about content, sometimes about grades or course procedures, and sometimes they will be about the treatment of participants in the class. In order to facilitate the resolution of these disagreements, 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 it is that is bothering 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.
GEOG 4110/5100

May 2017

QUESTIONNAIRE

NAME_________________________________    YEAR _________

MAJOR______________________    CONCENTRATION  _________________

WHAT OTHER COURSEWORK have you taken related to Statistics, Cartography / GIS or Remote Sensing? (map use, map making, remote sensing, landscape architecture, surveying, environmental design, civil engineering, planning)

1. ___________________________  2. ___________________________

3.___________________________    4.  ___________________________

WHAT DO YOU EXPECT TO LEARN BY TAKING THIS COURSE?

____________________________________________________________________________________

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WHAT CONCERNS DO YOU HAVE ABOUT TAKING THIS COURSE?

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Thanks for filling this out. This will help us to understand more about you.