GEOG 481: Introduction to GIS, Summer 2018 (DRAFT)

Instructor: Devin Lea (dlea@uoregon.edu)
Office: Condon 105
Office Hours: 3pm-4pm, Mondays and Tuesdays in Reed Room (Knight Library)

Lecture: Mondays and Tuesdays, 1pm-2:20pm in Condon 106
Lab: Wednesdays, 1pm-3:20pm in McKenzie 442

Course Website: canvas.uoregon.edu


Extra Lab hours: Check the calendar for availability: http://ssil.uoregon.edu/calendars/ for SSIL Classrooms and Reed Room in Knight Library

Server access:
- Remote access to the SSIL Network Drives https://ssil.uoregon.edu/ssil/ssil-network-drives-and-connecting-remotely/
- VPN access to the U of O Network https://it.uoregon.edu/vpn

Course Overview and objectives:
An introduction to mapping, geospatial data, cartography and spatial analysis, this class addresses questions in three major areas:
1. How can people sense and represent the ‘real’ world?
2. How can we record, recall, and analyse this information?
3. How can we communicate and discuss this information with other folks?

The class explores these questions through the applied use of software designed to facilitate the recording, symbolization, analysis, and communication of data about the world - that is, to turn data about the real world into information useful for acting in the real world. This is often done with maps, and much of the work will involve the use of “Geographic Information Systems (GIS)” or other mapping software. Class discussions and other activities explore Geographic Information Science - how the development of modern geospatial data collection and analysis capabilities are changing the way science and society operates.

By the end of the class, students should have a fundamental understanding of how spatial data is represented, how the data is stored and analyzed, how the results of this are communicated, and why and when these techniques are appropriate. Applied skills learned include the ability to follow instructions, to find help when the instructions fail, and to create maps and conduct basic spatial analysis using GIS software.
Learning Outcomes

- Understand the mathematical fundamentals underlying geographic coordinate systems and other geographic reference systems
- Are able to critically evaluate maps and GI systems output in a scientific way
- Can analyze and visualize geographic data sets using GI systems tools
- Understand the role and function of the technical components of current GI systems, as well as their historical roots

Expected workload

The course contains lectures, reading assignments, and in-class activities/quizzes, as well as lab assignments, including a final project. Students spend three hours in lectures and two hours in labs per week. Each lecture approximately consists of 50 mins of presentation by the instructor and 30 mins of in-class activities. Presentations are interleaved with in-class activities, in order to allow students to actively engage with concepts and to make theoretical material tangible with hands-on experience. In-class activities include short quizzes, discussion group exercises, and mapping exercises. Assignments deepen the practical part of the learning experience enabling students to apply the presented concepts so as to reach learning objectives. Assignments practice the main steps for deriving a geospatial analysis and visualization using GIS tools. Students are expected to spend about eight hours per week on assignments: two hours in labs and on average six hours outside of classroom. Another two hours outside of classroom are required for course readings.

Course grading

30% - 3 scheduled quizzes in weeks 3, 5, and 7.
20% - Additional take-home or in-class quizzes and exercises.
30% - Lab exercises
20% - Final Project and Presentation

Grading Rubric

Grading criteria follow http://gradeculture.uoregon.edu:

- **A+** Only used when a student’s performance significantly exceeds all requirements and expectations for the class. Typically very few to no students receive this grade.
- **A** Excellent grasp of material and strong performance across the board, or exceptional performance in one aspect of the course offsetting somewhat less strong performance in another. Typically no more than a quarter of the students in a class receive this grade, fewer in lower-division classes.
- **B** Good grasp of material and good performance on most components of the course. Typically this is the most common grade.
- **C** Satisfactory grasp of material and/or performance on significant aspects of the class.
- **D** Subpar grasp of material and/or performance on significant aspects of the class.
- **F** Unacceptable grasp of material and/or performance on significant aspects of the class.
Grading in basic activities, such as quizzes and lab assignments, evaluates in how far an answer reflects that the question with its background was understood and solved following the methods to be applied in the specific answer. Grading of advanced activities with higher degrees of freedom, such as the final project, additionally evaluates the suitability of the choices made, e.g. the project plan, the method chosen for analysis, the choice of articles selected for review. Students should make sure that they seek guidance early for this so as to actively discuss alternatives and should justify their choices in write-ups.

Schedule GEOG 481 (subject to possible changes):

Week 1:
Monday:
   Lecture 1: Introduction and What is GIS?
   Reading: Heywood, Preface and Chapter 1
Tuesday
   Lecture 2: Spatial data
   Reading: Heywood, Chapter 2
Wednesday
   Lab 1: Introduction to ArcMap, Projections (due by the night before lab, week 2)
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Week 2:
Monday:
   Lecture 3: Spatial data modeling
   Reading: Heywood, Chapter 3
Tuesday:
   Lecture 5: Database management (2)
   QUIZ 1
Wednesday:
   No Class (Independence Day)
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Week 3:
Monday:
   Lecture 4: Database management (1)
   Reading: Heywood, Chapter 4
Tuesday:
   Lecture 6: Data input and modeling (1)
   Reading: Heywood, Chapter 2 and 5
Wednesday:
   Lab 3: Spatial selection and attribute queries (due by the night before lab, week 4)
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Week 4:
Monday:
   Lecture 7: Data input and modeling (2)
**Wednesday:**

- **Lab 4:** Tsunami Planning: Siting food relief centers (due by the night before lab, week 5)

**Week 5:**

**Monday:**
- **Lecture 8:** Data analysis (1)
- **Reading:** Heywood, Chapter 6

**Tuesday:**
- **Lecture 9:** Data analysis (2)
- **QUIZ 2**

**Wednesday:**
- **Lab 5:** Table joins and spatial clipping: Vegetation (due by the night before lab, week 6)
- **Extra Credit Lab:** Georeferencing (due by week 7, August 12th)

**Week 6:**

**Monday:**
- **Lecture 10:** Analytical modeling in GIS
- **Reading:** Heywood, Chapter 7

**Tuesday:**
- **Lecture 11:** Output: from new maps to enhanced decisions (Cartography)
- **Reading:** Heywood, Chapter 8

**Wednesday:**
- **Lab 6:** Final Project Proposal and Feedback on other proposals (due by week 7)

**Week 7:**

**Monday:**
- **Lecture 12:** Data quality issues
- **Reading:** Heywood, Chapter 10

**Tuesday:**
- **Lecture 13:** Human and organizational issues & GIS project design and management
- **QUIZ 3**

**Wednesday:**
- **Lab 7:** Final Project (Presentations on Wednesday of week 8, due by Thursday of week 8)

**Week 8:**

**Monday:**
- **Lecture 14:** Past, present and future of GIS/ course review

**Tuesday:**
- **Lecture 15:** Open class day to work on projects?

**Wednesday:**
- **Lab 8:** Present Final Projects! (Submit final writing and maps by Thursday, Aug 16th, 11:59 pm)

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Lab Sessions: Please plan ahead and SAVE YOUR FILES OFTEN while you are working; computers may freeze and software may crash without warning and any unsaved work is likely to be lost. Please save your files in your student folder on the SSIL server. Feel free to also save files on a laptop, a thumb drive, or other storage devices.

All online submissions (digital copies of maps and responses to questions) are due on Canvas on Tuesdays at 11:59 pm (i.e. the night before your lab) in pdf format. All printed copies of maps are due at the beginning of lab (within the first 10 minutes).

Student Responsibility: Previous knowledge: There is no prerequisite of previous experience with GIS, but there is an assumption of familiarity with using computer. As described by Heywood regarding the level of the textbook: “This book assumes basic familiarity with PC computing. […] Familiarity with terms such as hardware and software, the Internet and the major components of a computer: for example, monitor, keyboard, hard disk drive, CD-ROM drive, processor and memory. We make no other assumptions” (p.xvi)

Conduct: All students are expected to adhere to the Student Code of Conduct and conduct themselves accordingly in the classroom and lab settings; students who are disruptive will be asked to leave the classroom.

Academic Honesty: Unless explicitly stated in the instructions, students are expected to complete their own work on all assignments. Students may discuss lab assignments, but each student is responsible for completing their own work. Work done by others must be appropriately cited. The complete code of conduct can be found on the University of Oregon website: http://dos.uoregon.edu/StudentConductandCommunityStandards/StudentConductCode.aspx

Students with Disabilities: To encourage an inclusive environment, we will make reasonable accommodations to provide all students with the resources to participate in class activities. Students with disabilities who require accommodations to participate in class or meet course requirements are encouraged to first contact the Accessible Education Center (http://aec.uoregon.edu/, 164 Oregon Hall, 3461155) and then contact me as soon as possible.