GEOG 1800:
Introduction to Geographic Information Science

Fall 2021 Syllabus

Professor
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Office: Natural Resources (NR) 218
Office hours: Wednesday 1:30 – 3:00 pm and by appointment

Teaching Assistants
Kane Cook
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Lab help hours by appointment

Undergraduate teaching fellow
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Lab help hours by appointment

Lectures
Live on Zoom (link on Canvas)
First five weeks of semester (until Oct. 1)
Monday, Wednesday, & Friday, 9:30–10:20 am
Remainder of semester
Monday & Wednesday, 9:30-10:20 am

Labs
Life Science Building (LSB) 225A
Section 501: Wed, 10:30–11:45 am (LSB 225A)
Section 502: Thu, 1:30–2:45 pm (LSB 225A)
Section 503: Fri, 1:30–2:45 pm (LSB 225A)

Note: in-person attendance is recommended but not required for labs. All lab instructions and additional videos will be provided on Canvas.

Please wear a mask when attending in-person labs for the safety of yourself and others.

Course fee
The course fee of $19 is used to provide hardware, software, and support in the GIS computer labs.

Course description
Geographic Information Systems (or GIS) is the technology used to capture, manage, analyze, and map geographic information. Geographic information is simply information about where something is and what is there: it is information with a location. GIS is used in many different fields, including environmental science, urban planning,
wildlife science, epidemiology, climate science, forestry, aquatic science, geology, political science, human geography, environmental engineering, homeland security, transportation planning, among others.

Geographic Information Science (or GIScience) is the science behind the technology of Geographic Information Systems. GIScience studies the underlying theory and building blocks of GIS. GIScientists work to improve knowledge about GIS, its applications, and to address fundamental questions that GIS raises for society.

This course will introduce the fundamental concepts of both geographic information systems and science, including geographic data, mapping, geospatial analysis, and geospatial technologies. The course involves both lectures and hands-on lab activities using ESRI ArcGIS Pro, a widely used commercial GIS software package.

While you will gain a working knowledge of ArcGIS, the focus of the course is on analytical concepts that are fundamental in any GIS environment. After the successful completion of the course, students should:

1. Understand basic concepts and terminology of geographic data, spatial analysis, geospatial technologies, and cartography
2. Develop skills in the operation of GIS software
3. Be able to formulate a research question and implement analytical steps to answer the question using GIS
4. Know how to find and use resources, including sources of geospatial data, to answer questions and solve problems

Prerequisites and expectations

There are no prerequisites for this course, but you should be familiar with the Windows operating system and be able to perform basic tasks such as copying files and folders, editing documents and spreadsheets, navigating websites, and using search engines and online mapping tools (such as Google Maps). As with any university-level course, an understanding of basic mathematics and statistics is required. You will be expected to write professionally with proper spelling and grammar.

Course materials

Required text

Bolstad, Paul. GIS Fundamentals: A First Text on Geographic Information Systems. Eider Press. (Book available at the USU campus store or online). Either the Sixth edition (2019) or the Fifth edition (2016) is OK.

Additional readings will be available on Canvas.

USB Drive

You will need a USB drive to store data and documents in the computer labs. The lab computers do not save data or files between sessions. Therefore you must save your maps and data to a personal USB drive if you wish to retain these files. Save and back up your data often!

Canvas

We will use Canvas (usu.instructure.com) throughout the course for announcements, submitting assignments, online discussions, and grade reporting. It is your responsibility to use the Canvas system. Questions about Canvas can be directed to the USU IT service desk (it.usu.edu, servicedesk@usu.edu, 435-797-4357).

Computer Hardware and Software

A personal computer is not required for this course, but one can be useful. Lab assignments will be based on ArcGIS Pro version 2.8, which is available on all lab computers as well as the workstations in the Quinney Library (http://qcnr.usu.edu/college/about_us/quinney_computer_lab)
An ArcGIS Pro student license is available for students who wish to use ArcGIS on their own computers. Please see Canvas for instructions. Note that ArcGIS is only compatible with the Windows operating system. If you have a Mac, you will need to install Boot Camp or a virtual Windows machine such as Parallels, Vmware, or Virtual Box.

Course structure

Lectures (On ZOOM)

The class will meet three times a week (M,W,F) for lecture sessions for the first five weeks of the semester. For the remainder of the semester the class will meet twice a week (M,W). The lectures will include a presentation on the topic for that day, and there may also be exercises, quizzes, and small group activities to demonstrate GIS principles. The lecture is intended to be an interactive environment. Active participation is essential to your learning in this course.

Readings

Readings will be assigned for each week of lecture sessions. It is your responsibility to complete the readings listed on the course schedule before coming to class.

Quizzes and mini-assignments (10%)

There will be 10-15 unannounced quizzes or short assignments during the semester. Quizzes may cover material from previous lectures, labs, and reading assignments. The quizzes are designed to be similar in format and content to the questions presented on the midterm and final exams.

During the lecture I will present the quiz questions and discuss the answers. You will then have two days to complete the quiz online on Canvas. If you have participated in the lecture, you will know the answers.

The lowest two quiz grades (including missed quizzes) will be dropped from your final grade.

Exams (20%)

There will be two exams: a mid-term exam and a final exam during finals period. Exams will cover content from lectures, readings, and labs and will include multiple choice and short answer questions.

Exams will take place online on Canvas. Exams are open book and will be time-limited to 60 minutes, unless prior accommodation has been arranged with the Disability Resource Center.

Labs (55%)

Lab assignments are a core requirement of this course. See section “Labs” below for more details.

Final Lab project (15%)

In the final lab project you will have the opportunity to showcase the skills and concepts you have learned during the semester. Unlike the lab assignments for which detailed instructions are provided, the final project will be mostly self-directed.

Grading scale

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<thead>
<tr>
<th>Grade</th>
<th>A</th>
<th>A–</th>
<th>B+</th>
<th>B</th>
<th>B–</th>
<th>C+</th>
<th>C</th>
<th>C–</th>
<th>D+</th>
<th>D</th>
<th>F</th>
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<tr>
<td>%</td>
<td>94-100</td>
<td>90-93</td>
<td>87-89</td>
<td>84-86</td>
<td>80-84</td>
<td>77-79</td>
<td>74-76</td>
<td>70-73</td>
<td>67-69</td>
<td>60-66</td>
<td>&lt; 60</td>
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Rubric

Students will be responsible for the following work:

<table>
<thead>
<tr>
<th>Percent of grade</th>
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<tbody>
<tr>
<td>Lab assignments (11 total)</td>
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<tr>
<td>Final project</td>
</tr>
<tr>
<td>Quizzes and mini-assignments</td>
</tr>
<tr>
<td>Mid-term exam</td>
</tr>
<tr>
<td>Final exam</td>
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<td><strong>100%</strong></td>
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Labs

Each student must be enrolled in a lab session. The lab is intended to provide time for hands-on experience working with GIS software to complete the lab assignments. The lab teaching assistant will be available during the lab to answer questions. For most lab assignments, students will also need to work outside of lab period to complete the assignment.

Video introductions

Short video introductions to each lab assignment will be posted on Canvas. Introductions will include an overview of the learning objectives, materials, and expected deliverables for each lab. You must review these video introductions **before** attending the lab each week.

Lab attendance

The lab portion of this course is critical. You cannot learn GIS by only attending the lecture. You may attend a different lab section any week that you miss a lab or if you need some extra help completing an assignment, as long as there are enough computers for students who are registered for that section. If you decide to regularly attend a different lab section, please notify the lab instructor by email or Canvas message.

Lab assignments

There will be 11 lab assignments. Lab exercises have been written to introduce you to the fundamental tools of ArcGIS, teaching you to think and problem solve spatially, and to be resourceful when troubleshooting problems. Assignment types will vary depending on the week and subject matter being covered; however, assignments will generally require some research, time in the lab, and information portrayed in your own words. Lab assignments will be introduced each week in the video introductions. Written instructions and data files are posted on Canvas. As a general rule each assignment will be due by Friday at midnight the following week.

Lab exercises will not always be finished within the lab period. Late assignments will be penalized according to the late work policy for the course (below). However, it is better to turn labs in late rather than not turn them in at all. Each lab exercise builds on knowledge and skills acquired in previous assignments. Assignments get progressively more complex and instructions become less detailed throughout the semester. You cannot afford to get behind.

You will submit most lab exercises on Canvas. Individual feedback will be provided on Canvas; individual comments will be provided on the grading rubric associated with each exercise. The feedback provided is designed in part to help the student improve their cartography and presentation style, which is a critical component of effectively presenting GIS results.
Lab assignments will be graded not only on providing the “correct” answers, but also on your ability to clearly and professionally express information through text and graphics.

**Lab Grading**

Grading rubrics for each lab can be found under the individual assignment page on Canvas. Specific grading criteria are listed with the associated points each criteria is worth. If you do what is asked of you on each assignment, you will meet expectations and can expect to get a B. To get an A, your submissions will need to be exceptional. More information and details about grading will be available in lab.

**Lab Help**

The TAs and Undergraduate Teaching Fellow will be available weekly outside of the lab time to provide one-on-one consultation on questions about lab assignments. See Page 1 for contact information. We will also provide a Canvas discussion board for each assignment.

**Course policies**

**Attendance and participation**

Attending each lecture and lab session is necessary to achieve a satisfactory grade in this course. If you miss class, do not e-mail the instructor to ask what you missed. It is your responsibility to obtain materials or notes from other students and Canvas.

**Late work**

It is your responsibility to turn in all work on time. **Grades for assignments will be reduced by 1 percentage point for each day late**, unless previously arranged with the instructor.

If you have unforeseen circumstances (such as a medical or family emergency) that affect your participation in the course please communicate as soon as possible with the instructor to arrange an alternate plan for completing your course work.

**Academic Honesty**

Students are expected to produce original work. Plagiarism or falsification of any kind will be subject to disciplinary action. Offences will be referred to Utah State University Admissions office. The USU policy for academic honesty can be found at: https://studentconduct.usu.edu/studentcode/article6. Please review this document to understand the Utah State University policy on academic honesty. If you have questions or concerns about the policy, please contact your instructor or academic advisor.

**Plagiarism**

Plagiarism includes knowingly “representing, by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged used of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.” The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, and denial or revocation of degrees.

**Students with Disabilities**

Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will require some accommodation by the instructor, the student must contact the Disability Resource Center (435-797-2444; http://www.usu.edu/drc ), preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor.