GEOG 488 / GEOG 588 / USP 591
Geographic Information Systems I: Introduction

	Undergraduates		Graduate Students			
	Section	**CRN**	**Section**	**CRN**	**Location**	**Day and Time**
Lecture	GEOG 488-001	61273	GEOG 588-001	61293	VSC B1-15	M 14:00-15:50
			USP 591-002	63623		
Lab	GEOG 488L-001	61275	GEOG 588L-001	61294	VSC B1-09	T 16:00-17:50
	GEOG 488L-002	61276	GEOG 558L-002	61295		W 16:00-17:50

Term: Spring 2025

Instructor: Chris Grant (he/him)   <cag2@pdx.edu>
Office Hours: by appointment

Teaching Assistant: Martine Cartier (she/her)   <martine@pdx.edu>
Office Hours: by appointment

Course Materials: We will use Canvas for this course (canvas.pdx.edu).

Course Objectives

GEOG 488/588 is an introductory course covering the theory and application of geographic information systems (GIS). The course includes an overview of the general principles of GIS and practical experience in its use. The practical component involves the use of the Esri ArcGIS Pro software package. Both the theoretical and practical components of the course are important. Without a theoretical understanding of GIS methods, you will make poor geographic modeling decisions and when necessary, you will not be able to migrate to a new or different GIS software package. Without a practical understanding of GIS software, your theoretical knowledge cannot be put to use.

Text and Readings

The recommended but optional textbook for the course is:

> Bolstad, Paul, and Steven Manson. *GIS Fundamentals: A First Text on Geographic Information Systems*. 7th edition. White Bear Lake, Minnesota: Elder Press, 2022.

Content Delivery Model

Content for this course will be delivered using a mixture of asynchronous and synchronous models. Some activities will be asynchronous (completed as individual activities on your own schedule), and others will be synchronous (we will all meet at the same, scheduled time). Asynchronous activities may be completed at whatever location is most convenient for you. Synchronous class meetings will take place in-person in the classroom(s) assigned to our course.

Lectures

Lectures will be delivered asynchronously in the form of pre-recorded videos and PDF copies of the lecture slides. You will view/read the lecture material on your own schedule prior to the scheduled synchronous class meetings, at which meetings we will address questions and discuss the lecture material.

Hybrid Course

This is a hybrid course. A fully in-person 4-credit course would have 4 hours of lecture class meeting time each week (time spent on labs is in addition to that). In the hybrid model used for this class, there will be 2 hours of synchronous recitation class meetings each week, and you will be expected to spend up to 2 additional hours per week on your own schedule viewing the pre-recorded lectures.

Recitation Class Meetings

Recitation class meetings will be conducted in person. We will meet synchronously (everyone at the same time) at our scheduled class time of 2:00 PM on Mondays. At these class meetings, we will cover any questions you may have had while viewing the lecture material, and we will discuss the lecture material. Most recitation class meetings will include problem-solving exercises and demonstrations of GIS software functionality. You are *strongly encouraged* to attend these class meetings, as they will help you understand the material better; however, the attendance policy is quite liberal (see below).

Attendance

Students who attend class regularly typically do better in this class than those who do not. To encourage participation, attendance counts for a small part of your overall grade. To get full credit, you must attend the two term-project presentation classes (the last two class meetings in the term), and you must attend at least 4 recitation class meetings during the term. A paper sign-in sheet will be used to confirm attendance. Attendance will not be taken at any lab class meetings.

Computer Lab Exercises and Lab Class Meetings

There will be eight weekly lab assignments that use ArcGIS Pro software. Each assignment will be a mix of tutorial exercises designed to introduce new concepts, plus some additional exercises where you apply what you learned in the tutorial. These exercises provide a way to acquire skills using ArcGIS and allow you to apply the course concepts to real data.

ArcGIS Pro software may be accessed in a number of ways, as detailed in the first week's lecture materials.

If, in any week, you are not able to attend your regular lab session, you are welcome to attend the other session instead.

Lab sessions will be conducted using Zoom. You may join the lab session from anywhere that you have access to ArcGIS Pro software. If you are on campus, and you need a place to join the

lab session, VSC B1-09 is reserved for our use during our scheduled lab class time. Alternatively, the lab assignments are designed so that they can, if you prefer, be completed independently on your own schedule.

Exams

There will be two midterms. Both will be open-book exams. The first midterm will focus on knowledge, while the second will ask you to apply the concepts and skills that you have learned. There will be no final exam. We will use that assigned time period for project presentations.

Project

Each student must complete a term project that will entail addressing a geography-related question using spatial analysis. The project is intended to provide a deeper understanding of GIS through an investigation of a particular research problem. You will need to acquire the spatial data and carry out the spatial analysis using the GIS software package you have been using in class. That means you must do more than just make maps. It is suggested that you use secondary GIS data sources available online to do your project. While you are welcome to digitize data or do a field survey to create your own spatial dataset, doing so is *very* time-consuming and is not the purpose of this project. Performing a spatial analysis is the purpose of this project. The grade for your project is based on the cohesiveness and logic of your research question, and the appropriateness of the methods and techniques. The complexity and comprehensiveness of your project will not be criteria for judging the quality of your project. The term project will be described in detail in lecture during week 3.

Graduate students will work on self-defined projects. There are three stages to the project:

1. Submit a one- or two-page project proposal by the start of week 6. It should include a research question, a detailed description of the spatial and attribute data you will use, and a conceptual description of the methods you will use. **You must discuss the proposal with the instructor before turning it in.**
2. Schedule your presentation for either the final day of class or during finals week.
3. Oral presentations. Every presentation must include the following sections: an Introduction, Datasets Used, Analysis Methods, Results, and Conclusions. Turn in a PowerPoint presentation.

Undergraduate students will choose from a list of pre-defined project topics—the project will be like a lab exercise, but with very few instructions. A written project report must be submitted by the time of the final exam period. The project report must include the following sections: an Introduction, Datasets Used, Analysis Methods, Results, and Conclusions.

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Grading

	Geog 488	Geog 588 / USP 591
lab assignments	50%	40%
term project	15%	25%
midterm exams	25% (12.5% each)	
attendance	10%	

Grading break points will be near 90% (A), 80% (B), and 70% (C). However, exact break points will depend on overall class results.

Academic Integrity

You are responsible for the content and integrity of the academic work you submit. The guiding principle of academic integrity shall be that your submitted work, examinations, and projects must be your own work. Cutting and pasting information from the internet without giving proper credit to your source is considered plagiarism. Submitting work done by another student and representing it as your own work is plagiarism. If you need help determining what is or is not plagiarism, please talk to the instructor. Plagiarism is a form of academic misconduct and may result in academic sanctions as described in the PSU Code of Student Conduct (https://www.pdx.edu/dos/psu-student-code-conduct).

Access and Inclusion for Students with Disabilities

PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, useable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. The Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment.

If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations. To contact the DRC, call 503-725-4150, email drc@pdx.edu, or visit the DRC website (https://www.pdx.edu/disability-resource-center

- If you already have accommodations, please contact me to make sure that I have received a faculty notification letter and to discuss your accommodations.

- Students who need accommodations for tests and quizzes are expected to schedule their tests to overlap with the time the class is taking the test.

- Accommodations are not automatically applied. If you are eligible to receive an accommodation, and you want to use it, please let me know.

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Title IX Reporting Obligations related to Discrimination and Harassment

As an instructor, students may at times come to me for assistance in matters that are not related to the course material. Please be aware that PSU's policies require faculty members to report any instance of sexual harassment, sexual and relationship violence and/or other forms of prohibited discrimination to University officials. If you would rather share information about these experiences with a PSU staff member who does not have these reporting responsibilities and can keep the information confidential, please contact one of the following campus resources (or visit https://www.pdx.edu/sexual-assault/get-help):

- Confidential Advocates (503-894-7982) or psuwrc.youcanbook.me (for matters regarding sexual harassment and sexual and relationship violence)

- Center for Student Health and Counseling (SHAC): 1880 SW 6th Ave, (503-725-2800)

- Student Legal Services: 1825 SW Broadway, (SMSU) M343, (503-725-4556)

The PSU Sexual Misconduct Response website (https://www.pdx.edu/sexual-assault/) provides comprehensive information about how to get support if you have experienced sexual misconduct, and/or how to report an incident.

For more information about Title IX, please complete the required student module, Understanding Sexual Misconduct and Resources: (https://www.pdx.edu/diversity/understanding-sexual-misconduct-and-resources-student-module)

Canvas Learning Management System

This course uses Canvas as the main learning platform. If you haven't used Canvas before, I recommend that you take the PSU Learning Center's remote readiness course this week. (https://www.pdx.edu/learning-center/online-remote-learning-support-canvas)
If you've used Canvas and you just need occasional technical support, contact the OIT Helpdesk. (https://www.pdx.edu/technology/support)
If they can't help you, please let me know.

Flexibility Statement

The instructor reserves the right to modify course content and/or substitute assignments and learning activities in response to institutional, weather, or class situations.

Add / Drop / Withdraw Dates

Last Day to Drop with 100% refund: 6 Apr
Last Day to Add: 11 Apr
Last Day to Drop: 13 Apr
Last Day to Withdraw: 18 May
Last Day to Change Grading Option   18 May
 (http://www.pdx.edu/registration/academic-calendar)

Course Schedule

Week	Topics	Labs	Notes
Week 1	– Course administrative information – What is GIS? – Who uses GIS and how is it used? – Site suitability example – Critical GIS – Intro to cartography – Map elements – Principles of map design – Scale	**LAB 1: Introduction to ArcGIS Pro** **Due 11 Apr**	
Week 2	– Visual variables – Types of thematic maps – Data classification – Data normalization – Metadata – Cartograms – Data models and vector data – Levels of measurement – Topology	**LAB 2: Map Symbology & Classification** **Due 18 Apr**	
Week 3	– Raster data model – Term project information – Locating systems – Geodesy – Projections & projected coordinate systems – Projection in ArcGIS Pro	**LAB 3: Projections & Public GIS Data** **Due 25 Apr**	
Week 4	– Storing data—geodatabases – Querying data—queries, SQL, and selection methods – Data sources – MCE analysis #1	**LAB 4: Queries & Table Joins** **Due 2 May**	
Week 5	– Table joins and relates – Spatial joins – The nature of spatial data – MCE analysis #2 – Composite index analysis #1 – Case study #1	**LAB 5: Geodatabases & Editing Feature Data** **Due 9 May**	First Midterm covers weeks 1-4 **Due 30 Apr**
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Week	Topics	Labs	Notes
Week 6	– Geocoding – Creating datasets – Uncertainty – Vector analysis 1 – MCE analysis #3 – Composite index analysis #2 – Case study #2	LAB 6: Geocoding & Mapping XY Data **Due 16 May**	Term project proposals due (graduate students) Term project topics posted (undergraduate students)
Week 7	– Vector analysis 2 – Spatial modeling – MCE analysis #4 – Composite index analysis #3 – Case study #3 – Case study #4	LAB 7: Introduction to Spatial Vector Analysis **Due 23 May**	
Week 8	– Raster analysis 1 – Raster analysis 2 – Term project information – Case study #5 – Case study #6 – Case study #7	LAB 8: Introduction to Spatial Raster Analysis **Due 30 May**	Second Midterm published 22 May covers weeks 1-7
Week 9	– Advanced spatial analysis – Case study #8	no new lab	
Week 10	– GIS software – End-of-term stuff	no new lab	Second Midterm **Due 6 Jun** Term project presentations (Monday)
Week 11 (finals week)			Term project presentations (Wednesday)

Notes:

Memorial Day, **Monday 26 May**, is a holiday (university closed).

The day and time for our last class meeting, during finals week, are different from our normal meeting day and time. Our last class meeting is on **Wednesday**, **11 Jun, from 12:30 to 14:20 PM**.

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