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	41171	GEOG 588-001	41185	Online	Tue and Thur 13:30-14:35
			USP 591-002	43648		
Lab	GEOG 488L-001	41172	GEOG 588L-001	41187	Online or VSC B1-08	Wed 13:30-15:10
	GEOG 488L-002	41173	GEOG 558L-002	41186		Tue 15:30-17:10

Term:　　　　　　　　Winter 2026

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 <u>recommended</u> but <u>optional</u> 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 online, using Zoom.

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 synchronous 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 online, using Zoom. We will meet synchronously (everyone at the same time) at our scheduled class time of 1:30 PM on Tuesday and Thursday. 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 8 recitation class meetings during the term. Zoom meeting reports 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

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lab session, VSC B1-08 is reserved for our exclusive use during our scheduled lab class time. Attendance at the lab sessions is encouraged, but 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.

Class Communication

We will use the **Slack** on-line collaboration tool to communicate with one another. Slack is a free service and does not require you to set up an account. During the first week of class, you will receive an email inviting you to join the Geog380 Slack workspace.

We will use **Zoom** for virtual meetings such as synchronous class meetings, office hours, and online assistance (see next section).

Refer to the **Geog488_588 Communication** document on Canvas for additional details.

Videoconferencing, Recording, and FERPA

The Family Educational Right and Privacy Act (FERPA) of 1974 (Public Law 93-380), affords students certain rights with respect to their educational records and requires Portland State University to assure that those students' rights are not abridged. FERPA protects the privacy of all "education records," in any medium, maintained by Portland State University.

Our use of **Zoom** is governed by FERPA, the [OIT Acceptable Use Policy](#), and [PSU's Student Code of Conduct](#). A record of all meetings and recordings is kept and stored by PSU, in accordance with the Acceptable Use Policy and FERPA. Your instructor will not share recordings of your class activities outside of course participants, which include your fellow students, TAs/GAs/Mentors, and any guest faculty or community based learning partners that we may engage with. **You may not share recordings outside of this course**. Doing so may result in disciplinary action.

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).

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Generative AI Policy

In this course, you are permitted to use generative AI tools, such as ChatGPT or Gemini, *unless the instructions for an assignment explicitly forbid their use*. However, to uphold scholarly standards, you must cite any AI-generated material that contributes to your work, including in-text citations, quotations, and references. Using an AI tool to generate content without giving proper attribution constitutes academic misconduct. The PSU Library has a guide with suggestions about how to cite work done using generative AI tools (https://guides.library.pdx.edu/c.php?g=271259&p=9781184).

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.

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 psuca.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: Parkmill Suite 184, 1633 SW Park Ave (on the Park Blocks, opposite Lincoln Hall) , (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: 11 Jan
Last Day to Add: 16 Jan
Last Day to Drop: 18 Jan
Last Day to Withdraw: 22 Feb
Last Day to Change Grading Option   22 Feb
(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 16 Jan**	
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 23 Jan**	
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 30 Jan**	
Week 4	– Storing data—geodatabases – Querying data—queries, SQL, and selection methods – Data sources – MCE analysis #1	LAB 4: Queries & Table Joins **Due 6 Feb**	
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 13 Feb**	First Midterm covers weeks 1-4 **Due 5 Feb**
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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 20 Feb**	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 27 Feb**	
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 6 Mar**	Second Midterm published 26 Feb 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 13 Mar** Term project presentations (Thursday)
Week 11 (finals week)			All term project work **Due 17 Mar** Term project presentations (Tuesday)

Notes:

Martin Luther King, Jr. Day, **Monday 19 Jan**, is a holiday (university closed).

The day and time for our last class meeting, during finals week, is the same as our normal meeting day and time. Our last class meeting is on **Tuesday**, **17 March, from 1:30 PM to 3:20 PM**.