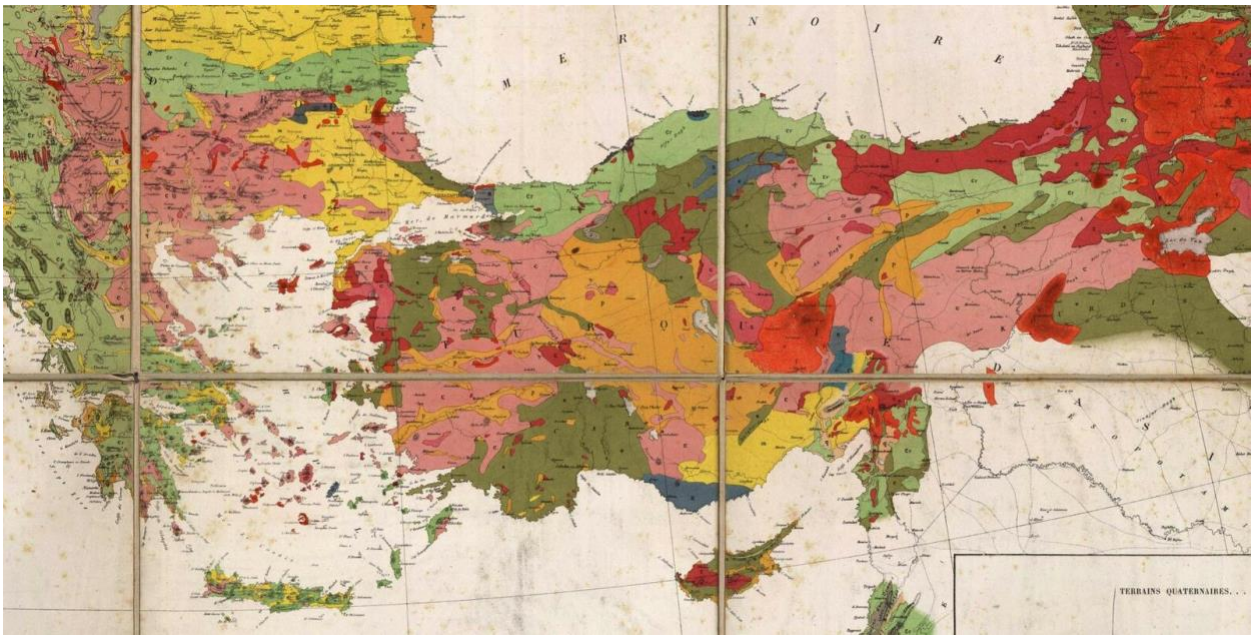
Introduction to Geographic Information Systems

EVST 1010 / URBN 1010
Loyola Marymount University, Spring 2023

Time: Tues/Thurs 11:50am-1:30pm
Location: UNH 3408
Instructor: Professor Tyler Harlan
Email: tyler.harlan@lmu.edu
Office hours: Weds 1:00-2:30pm (in-person in UNH 4326 or on Zoom; sign-up required)



Geologic Map of Turkey, 1930s

Course description

This course introduces the fundamental concepts, principles, and tools of geographic information systems (GIS). Whether for urban planning, wildlife management, transcontinental shipments, or simply navigating with our phones, GIS is inseparable from modern existence. In this course, we will learn how to think spatially, produce maps and conduct data analysis with GIS techniques, and understand how geography and GIS can be applied to research. Key concepts and ideas are reinforced through weekly lab assignments and a final project.

Learning outcomes

1. Sharpen your geographical knowledge and spatial awareness.
2. Develop proficiency in GIS techniques that enable you to produce high-quality maps and conduct basic spatial analysis.
3. Learn to formulate and answer research questions about pressing environmental and social issues using a spatial perspective and GIS.

Required text

Shin, Michael; Campbell, Jonathan; and Burkhart, Sierra. 2022. *Essentials of Geographic Information Systems* (Version 3.0). Boston: Flatworld.

The textbook is available directly through the Flatworld Publishing website. Please ensure that you purchase Version 3.0. You may purchase either an e-book or a hard copy of the textbook.

Course structure and format

This course is divided into weekly units, with course content made available on Brightspace every **Monday at 9:00am**. Each unit consists of an introductory recorded lecture (with links to short videos), a weekly assignment with associated technical screencasts, and a weekly quiz. All materials are available on Brightspace. You must watch the lecture, take the quiz, and submit the weekly assignment by **Sunday at 11:59pm.**

Our Tuesday and Thursday class meetings are set aside as **labs** for you to work together on your weekly assignments and ask questions. Attendance is required at both labs.

The discussion forum on Brightspace will serve as the primary venue for all questions related to the course. You are expected to check and contribute to the discussion forum regularly.

Labs

Tuesday and Thursday labs enable you to work on weekly assignments together and ask questions. Give yourself plenty of time to complete assignments and attend your lab prepared!

Since assignments are posted on Mondays, it is expected that you come to labs having already reviewed the weekly assignment. Come prepared with specific questions and suggestions for your classmates to get the most out of the labs.

You are strongly encouraged to work together, but the grading rubric for your weekly assignments includes a creativity and originality component to recognize independent work.

Optional study session

LMU's GIS research assistant, Zara Dabdoub, will host a weekly in-person study session in our classroom, UNH 3408. The session will alternate between Friday afternoons (4:00-5:30pm) and Sunday evenings (7:30-9:00pm); see Brightspace for a tentative schedule. These sessions are entirely **optional** and no attendance will be taken. Simply use it as an additional time to get in-person help and work together with your classmates!

Time management

This course format requires a significant amount of independent work and time management. You have the flexibility to complete each week's assignment at any time during the week, but it is strongly recommended that you schedule **at least eight hours** per week on your calendars and outside of labs to dedicate to this course. In some weeks, the course may take more time, and other weeks, it may take less time. You will be given the structure, resources, and guidance for

learning the course content, but it is ultimately your responsibility to complete assignments and weekly quizzes on time.

Technical requirements

This course requires the use of a personal computer that runs on a Windows or Mac operating system. **Windows 10** is required for Windows users; **Mac OS X 10.13 (High Sierra) or higher** is required for Mac users. Please let me know immediately if you do not have access to your own computer with one of these operating systems, so that we can work out a solution.

This course also requires you to install 1) **QGIS version 3.22** and 2) **Microsoft Excel**. These programs are free to LMU students, and installation instructions are provided on Brightspace.

Course content (lecture videos, weekly assignments and associated screencasts, weekly quizzes, etc.) can be accessed on Brightspace using any device with internet capability, including phones.

Class communications

Students often encounter similar issues and have similar questions about assignments, and it is impractical for me to answer all questions by email. **Therefore, the discussion forum on the course webpage will be the primary venue for almost all communication.** See below for where to direct specific questions.

- Post all questions related to the syllabus, course requirements, course organization, weekly assignments, and course content to the discussion forum on Brightspace so that everyone can benefit.
- Direct questions about student accounts, forgotten password, and technical problems in the computing lab to the LMU ITS Service Desk (phone: 310-338-7777; email: helpdesk@lmu.edu)
- Direct questions about grades, adding/dropping the course, absences/late work, and any necessary accommodations to me by email or during office hours.

Using and contributing to the discussion forum

To facilitate collaborative learning, you are expected to contribute to the course discussion forum by both asking and answering questions. For those posting questions related to the assignment, do not expect immediate responses from your classmates or me, particularly in the evenings or during weekends. Please allow up to 24 hours for a response, and **if you know the answer to a posted question, please respond**. I will take of note students who regularly help classmates on the discussion forum.

Forum posts should be specific and informative. Posts that contain questions that are ambiguous (e.g., “I can’t do Assignment 3!”) or where the answer is obvious (e.g., “What GIS software are we using?”) may not receive a response. Any requests for others to complete any work (e.g., “What is the answer to X quiz question?”), or that include unconstructive remarks (e.g., “QGIS sucks!) will be also be ignored and may be removed.

Assignments and grading

Assignment	Weight	Points	Due
Participation (attending and contributing to labs)	10%	50	Weekly
Weekly quizzes	15%	75	Sundays 11:59pm
Weekly assignments	40%	200	Sundays 11:59pm
Midterm exam	15%	75	Feb 23
Final project portfolio	20%	100	May 5

Participation

Your participation is essential to make this a fulfilling and rewarding course!

Labs each count 0.4% towards your final grade. You will receive full participation credit if you attend lab, contribute regularly to discussions, and work together with your classmates on weekly assignments.

I will also make note of regular helpful contributors to the discussion forum when calculating final grades that may be "on the edge" (for example, on the edge of a B+ and A-).

Note that cumulative participation grades will be posted twice during the semester: once at the beginning of Week 8, and again at the beginning of Finals Week. Unexcused absences, habitual lateness, and not being engaged in discussions and group work will be reflected in your participation grade.

Weekly quizzes

Due every Sun @11:59pm

You are required to complete a weekly open book quiz covering topics from the textbook reading and recorded lecture. To gain access to the following week's content and assignment, you must earn a score of 50% or better. You can take the weekly quiz as many times as needed to access to the following week's content. Only your highest quiz score will be recorded.

Note that after each quiz attempt, you will only see which questions you answered correctly or incorrectly. You will NOT see the correct answer. Moreover, if you choose to take the quiz again, you may encounter a different set of questions. This quiz method encourages you to really learn the material. You only need to score 50% or above to access the following week's content, but you can take the quiz as many times as you want to obtain the highest score desired.

There are a total of 11 quizzes, each worth 1.5% of your grade. Brightspace will automatically drop your lowest quiz score (so that your grade will be calculated using your ten highest scores). Late quizzes will not receive credit unless I have granted you an extension.

Weekly assignments

Due every Sun @11:59pm

You are required to complete a weekly assignment that complements course content. Tuesday and Thursday labs are dedicated providing you with a venue to work together on the assignment and ask me questions. Weekly assignments are submitted through Brightspace. Grading rubrics will accompany each assignment. There are a total of 11 assignments, each worth 4% of your grade (except for the Unit 1 and Unit 6 assignments, which are lighter and thus each worth 2%).

Midterm exam

Thurs Feb 23 during class (11:50am-1:30pm)

You will take a practical midterm exam during the Week 7 Thursday lab session. The exam can be taken online using your personal computer. More details will be provided on Brightspace. The midterm exam is worth 15% of your grade.

Final project portfolio

Due Fri May 5 @11:59pm

You are required to create a final project that is focused on a pressing social or environmental issue that can be answered using a spatial perspective and GIS. You will be given the general parameters of your final project and are responsible for conducting the GIS-based research, analysis, and write-up of results. Details and parameters will be available on Brightspace far in advance of the due date. We will set aside two labs (Apr 25 and Apr 27) to work on your final project. The final project portfolio is worth 20% of your grade.

Policies

Academic integrity

You are welcome to share ideas, perspectives, and resources with your classmates – in fact, this is encouraged! But assignments themselves must be only your own work. LMU takes charges of cheating and plagiarism very seriously, with serious consequences that can range from receiving no credit for assignments/exams to expulsion. Cheating is taking advantage of the work of others. Plagiarism is representing the work of others as your own without giving appropriate credit.

Attendance and absences

Attendance is required for all labs. I will make note of attendance at the beginning of each class. Habitual lateness will cause your grade to suffer. If you cannot attend class due to an unforeseen problem, let me know the day before class. I may ask for a doctor's note or other documentation. If you have a scheduled conflict (such as an extracurricular event), let me know as far in advance as you can. Please talk to me at the beginning of the semester if you have any concerns about your ability to meet attendance requirements.

Emails

Professors have many responsibilities, and we are not always available to answer urgent emails. I will do my best to reply to emails within 24 hours; if I receive them on a weekend, I will reply by the end of the day on Monday. Please include your name and the course name in all emails.

Grading scale

A	93% to 100%
A-	90% to 92.99%
B+	87% to 89.99%
B	83% to 86.99%
B-	80% to 82.99%
C+	77% to 79.99%
C	73% to 76.99%
C-	70% to 72.99%
D	60% to 69.99%
F	0% - 59.99%

Late work

All written assignments should be uploaded to Brightspace by the due date. Hard copies are not required. Late work will be counted off 10% for each day late. After three days, late work will not receive credit. If a medical, family, or other emergency occurs that may prevent you from completing an assignment on time, please talk with me about the circumstances as soon as you can, and we will discuss resources for helping you to complete your work on time.

Office hours

I will hold office hours every Wednesday from 1:00-2:30pm. You must use a **sign-up sheet** (available on Brightspace) to reserve a time to meet with me during office hours. You may meet with me in-person or over Zoom – simply state your preference in the sign-up sheet.

If you have an unavoidable conflict during office hours (such as another class or work), please let me know and we can find another time to meet.

Accommodations for students with disabilities

Students with special needs as addressed by the Americans with Disabilities Act who need reasonable modifications, special assistance, or accommodations in this course should promptly direct their request to the Disability Support Services Office. Any student who currently has a documented disability (physical, learning, ADD/ADHD, psychiatric disabilities and those on the autism spectrum) needing academic accommodations should contact the Disability Services Office (2nd Floor of Daum Hall, 310-338-4216) as early in the semester as possible. All discussions will remain confidential. Please visit http://www.lmu.edu/dss for additional information.

Writing help and citation guidelines

If you need help with writing, I encourage you to take advantage of the LMU Writing Center. You can get one-on-one writing help through regular appointments or a weekly "Writing Lab" (ENGL 1115). Their website is https://academics.lmu.edu/arc/writingcenter/.

Tentative nature of the syllabus

This syllabus and its contents are subject to revision; students are responsible for any changes or modifications announced in class or posted to Brightspace.

Class schedule, readings, and assignments

Week	Date	Topic	Reading	Assignment
W1	Jan 10	Welcome and intro	No reading	No assignment
	Jan 12	Thinking spatially		
W2	Jan 17	Unit 1: Defining geography and GIS	Textbook Chap 1	Unit 1: Gathering and visualizing data
	Jan 19			
W3	Jan 24	Unit 2: GIS and GIS data	Textbook Chap 2	Unit 2: Computing techniques for QGIS
	Jan 26			
W4	Jan 31	Unit 3: Anatomy of a map	Textbook Chap 3	Unit 3: Reference mapping
	Feb 2			
W5	Feb 7	Unit 4: Queries and selections	Textbook Chap 5.5	Unit 4: Mapping with SQL
	Feb 9			
W6	Feb 14	Unit 5: Cartographic principles	Textbook Chap 4	Unit 5: Thematic mapping
	Feb 16			
W7	Feb 21	Midterm review	No reading – study!	No assignment (practice midterm available)
	Feb 23	**Midterm exam**		
BREAK	Feb 28	NO CLASS – SPRING BREAK		
	Mar 2			
W8	Mar 7	Unit 6: Satellites and GPS	Textbook Chap 5.1.3 and 6.3	Unit 6: Mapping GPS data
	Mar 9			
W9	Mar 14	Unit 7: Data models and geocoding	Textbook Chap 6.1-6.2	Unit 7: Geocoding
	Mar 16			

W10	Mar 21 Mar 23	Unit 8: Raster spatial analysis	Textbook Chap 7	Unit 8: Terrain analysis
W11	Mar 28 Mar 30	Unit 9: Spatial databases	Textbook Chap 5.2-5.4	Unit 9: Table joins
W12	Apr 4 Apr 6	NO CLASS – EASTER BREAK (Unit 10 content available)		
W13	Apr 11 Apr 13	Unit 10: Vector spatial analysis	Textbook Chap 8	Unit 10: Overlay analysis
W14	Apr 18 Apr 20	Unit 11: Beyond QGIS: ArcGIS Pro and Online	Textbook Chap 9	Unit 11: Story mapping with ArcGIS online
W15	Apr 25 Apr 27	Final project lab Final project lab	No reading	No assignment – final project due May 5