Geog 6815 Seminar on Geographic Information Science and Systems

Syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.

Course and Instructor Information

Course Title: Seminar on Geographic Information Science and Systems
Credits: 3
Format: In Person
In-class session: AUST 420 Mon 4 – 6:30 PM EST
Prerequisites: None; previous GIS experience is a plus.
Recommended Preparation: Geog 5500 or Geog 5510

Professor: Xiang "Peter" Chen
Office Hours: By Appointment

If you have course questions or need an in-person meeting:
- Email peter.chen@uconn.edu with your questions or make an appointment.

Course Materials

Required textbook:

There is no required textbook for this course. All the required reading materials or their links will be posted on HuskyCT [https://huskyct.uconn.edu/].

Required Software:

Students are required to have access to one of the GIS software (e.g., ArcGIS Desktop, ArcGIS Pro, QGIS) on a personal computer or in an UConn computer lab.

Course Description

An exploration of Geographic Information Science (GISc) and Systems (GIS) theories, methods, and critiques for physical and social sciences. Topics may range from fundamental to emergent themes including measurement biases, uncertainties, qualitative GIS, spatial big data, human dynamics, and GeoAI.

May be repeated for a total of six credits.

Course Format

The class will focus on critical discussion of literature about Geographic Information Systems (GIS), along with special sessions such as guest speaker events and labs to strengthen students' understanding of related topics. For a discussion session, students are required to complete the assigned readings before attending the class. For a lab session, students are required to bring a personal computer to the class or may use the lab computers when available.

Students are expected to participate in all class activities. Failure to participate in activities may affect the final class grade. Students are strongly encouraged to ask questions in class.

Course Objectives

By the end of the semester,

1. Students will be able to gain an improved understanding of critical theories and emergent trends in GIS.
2. Students will be able to gain an improved understanding of spatial data structure and database concepts.
3. Students will be able to identify different sources of open-access databases for acquiring geospatial data as

needed.
4. Students will devise practical GIS solutions to geospatial problems in an individual project.

Course Outline (and Calendar if Applicable)

Please see the last page. Please refer to HuskyCT for the latest schedule.

Course Requirements and Grading

Point Accumulation	
Assignments	**Percent**
Class participation	20
GIS Labs (x5)	30
Paper (x2)	20
Final Project	30
TOTAL	**100**

Grade Scale	
Percent	Grade
93-100	A
90-92.9	A-
87-89.9	B+
83-86.9	B
80-82.9	B-
77-79.9	C+
73-76.9	C
70-72.9	C-
65-69.9	D+
63-64.9	D
60-62.9	D-
Below 60	F

Class participation: It is expected students participate in all class activities in person. Absence will only be excused under emerging circumstances while the instructor is notified in advance. Students are encouraged to raise questions and actively discuss topics in class. Students will also be assigned research articles to present in class.

Assignments: Assignments take the form of GIS lab report or a reflection paper. All assignments are due at the specific time assigned. No late assignments will be accepted except in extraordinary circumstances.

Final Project: Students will carry out a course project in terms of a project report. Details will be given in the class.

Late Policy

All course due dates are identified in the course outline. If you have not made arrangements with the instructor prior to the due date, **late assignments will be given a reduction in points. The deduction is by 20% for each day after due.** Assignment submitted three days after the due will not be accepted except under special circumstances. Deadlines are based on Eastern Standard Time; if you are in a different time zone, please adjust your submittal times accordingly. *The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner.*

Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. This section provides a brief overview of important standards, policies, and resources.

Student Code

You are responsible for acting in accordance with the University of Connecticut's Student Code Review and become familiar with these expectations. In particular, make sure you have read the section that applies to you on Academic Integrity:

- Academic Integrity in Undergraduate Education and Research
- Academic Integrity in Graduate Education and Research

Cheating and plagiarism are taken very seriously at the University of Connecticut. As a student, it is your responsibility to avoid plagiarism. If you need more information about the subject of plagiarism, use the following resources:

- Plagiarism: How to Recognize it and How to Avoid It

- University of Connecticut Libraries' Student Instruction (includes research, citing and writing resources)

Copyright

Copyrighted materials within the course are only for the use of students enrolled in the course for purposes associated with this course and may not be retained or further disseminated.

Netiquette and Communication

At all times, course communication with fellow students and the instructor is to be professional and courteous. It is expected that you proofread all your written communication, including discussion posts, assignment submissions, and mail messages. If you are new to online learning or need a netiquette refresher, please look at this guide titled, The Core Rules of Netiquette.

Adding or Dropping a Course

If you should decide to add or drop a course, there are official procedures to follow:
- Matriculated students should add or drop a course through the Student Administration System.
- Non-degree students should refer to Non-Degree Add/Drop Information located on the registrar's website.

You must officially drop a course to avoid receiving an "F" on your permanent transcript. Simply discontinuing class or informing the instructor you want to drop does not constitute an official drop of the course. For more information, refer to the:

- Undergraduate Catalog
- Graduate Catalog

Academic Calendar

The University's Academic Calendar contains important semester dates.

Academic Support Resources

Technology and Academic Help provides a guide to technical and academic assistance.

Students with Disabilities

Students needing special accommodations should work with the University's Center for Students with Disabilities (CSD). You may contact CSD by calling (860) 486-2020 or by emailing csd@uconn.edu. If your accommodation request is approved, CSD will send an accommodation letter directly to your instructor(s) so that special arrangements can be made. (Note: Student requests for accommodation must be filed each semester.)

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government." (Retrieved March 24, 2013 from Blackboard's website)

Policy against Discrimination, Harassment, and Inappropriate Romantic Relationships

The University is committed to maintaining an environment free of discrimination or discriminatory harassment directed toward any person or group within its community – students, employees, or visitors. Academic and professional excellence can flourish only when each member of our community is assured an atmosphere of mutual respect. All members of the University community are responsible for the maintenance of an academic and work environment in which people are free to learn and work without fear of discrimination or discriminatory harassment. In addition, inappropriate Romantic relationships can undermine the University's mission when those in positions of authority abuse or appear to abuse their authority. To that end, and in accordance with federal and state law, the University prohibits discrimination and discriminatory harassment, as well as inappropriate Romantic relationships, and such behavior will be met with appropriate disciplinary action, up to and including dismissal from the University. Refer to the Policy against Discrimination, Harassment, and Inappropriate Romantic Relationships for more information.

Sexual Assault Reporting Policy

To protect the campus community, all non-confidential University employees (including faculty) are required to report assaults they witness or are told about to the Office of Diversity & Equity under the Sexual Assault Response Policy. The University takes all reports with the utmost seriousness. Please be aware that while the information you provide will remain private, it will not be confidential and will be shared with University officials who can help. Refer to the Sexual Assault Reporting Policy for more information.

Schedule

Week	Topic
1	Introducing Class
2	Network Analysis and Location-Allocation
3	Spatial Accessibility
4	Human Mobility: Conceptualization
5	Human Mobility: Gender, Race, and Inequities
6	Uncertain Geographic Context Problem
7	Uncertainties
8	Advances in Remote Sensing
9	Spring Break
10	GeoAI and Urban Sensing
11	Participatory GIS and Volunteered Geographic Information (VGI)
12	Geoprivacy and Geomasking
13	Geonarratives
14	Final Project
15	Final Project

* This schedule is subject to change. Please see HuskyCT for the latest schedule.

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Weekly Schedule

Week 1: Introducing Class Jan 18

- Review syllabus
- Complete survey
- Download and install QGIS
- Complete Lab 1 (due: Jan 24)
- Read the two papers in Week 2 for the discussion next week

Week 2: Network Analysis and Location-Allocation Jan 24

- The instructor will lead the discussion about the two papers in class
- Complete Lab 2 (due: Jan 31)
- Read the papers in Week 3 for the discussion next week

➢ Cova, T. J., & Church, R. L. (1997). Modelling community evacuation vulnerability using GIS. *International Journal of Geographical Information Science*, 11(8), 763-784.

➢ Chen, Z., Chen, X., Li, Q., & Chen, J. (2013). The temporal hierarchy of shelters: a hierarchical location model for earthquake-shelter planning. *International Journal of Geographical Information Science*, 27(8), 1612-1630.

Week 3: Spatial Accessibility Jan 31

- Discuss the papers in class (led by assigned students)
- Complete Lab 3 (due: Feb 7)
- Read the papers in Week 4 for the discussion next week

➢ Luo, W., & Wang, F. (2003). Measures of spatial accessibility to health care in a GIS environment: Synthesis and a case study in the Chicago region. *Environment and Planning B: Planning and Design*, *30*(6), 865-884

➢ Widener, M. J. (2018). Spatial access to food: Retiring the food desert metaphor. *Physiology & Behavior*, 193, 257-260.

Supplementary Reading:

➢ Guagliardo, M. F. (2004). Spatial accessibility of primary care: Concepts, methods and challenges. *International Journal of Health Geographics*, *3*(1), 1-13.

Week 4: Human Mobility: Towards People-Based GIS Feb 7

- Discuss the papers in class (led by assigned students)
- Complete Lab 4 (due: Feb 14)
- Choose **one of the papers** in Week 5 to read for the discussion next week

➢ Hägerstrand, T. (1970). What about people in regional science? *Papers of the Regional Science Association*, 24, 7–21.

- Miller, H. (2007). Place-based versus people-based geographic information science. *Geography Compass*, *1*(3), 503-535.

Week 5: From Human Mobility to Inequities Feb 14

- Discuss the papers in class (led by assigned students)
- Complete Lab 5 (due: Feb 21)
- Paper 1 is assigned (due: Mar 7).
- Read the papers in Week 6 for the discussion next week

- Kwan, M. P. (1999). Gender and individual access to urban opportunities: a study using space–time measures. *The Professional Geographer*, *51*(2), 210-227.

- Chen, B. Y., Wang, Y., Wang, D., Li, Q., Lam, W. H., & Shaw, S. L. (2018). Understanding the impacts of human mobility on accessibility using massive mobile phone tracking data. *Annals of the American Association of Geographers*, *108*(4), 1115-1133.

Week 6: Uncertainties Feb 21

- Discuss the papers in class (led by assigned students)
- Read the papers in Week 7 for the discussion next week

- Schwartz, S. (1994). The fallacy of the ecological fallacy: the potential misuse of a concept and the consequences. *American Journal of Public Health*, *84*(5), 819-824.

- Cheng, T., & Adepeju, M. (2014). Modifiable temporal unit problem (MTUP) and its effect on space-time cluster detection. *PloS One*, *9*(6).

Week 7: Uncertain Geographic Context Problem Feb 28

- Discuss the papers in class (led by assigned students)
- Read the papers in Week 8 for the discussion next week

- Kwan, M. P. (2012). The uncertain geographic context problem. *Annals of the Association of American Geographers*, *102*(5), 958-968.

- Chen, X., & Kwan, M. P. (2015). Contextual uncertainties, human mobility, and perceived food environment: The uncertain geographic context problem in food access research. *American Journal of Public Health*, *105*(9), 1734-1737.

Week 8: Advances in Remote Sensing Mar 7

- Guest Speaker: Dr. Zhe Zhu (UConn NRE)
- Read the papers in Week 10 for the discussion next week

- Zhu, Z., Zhou, Y., Seto, K. C., Stokes, E. C., Deng, C., Pickett, S. T., & Taubenböck, H. (2019). Understanding an urbanizing planet: Strategic directions for remote sensing. *Remote Sensing of Environment*, *228*, 164-182.

➢ Zhu, Z., & Woodcock, C. E. (2014). Continuous change detection and classification of land cover using all available Landsat data. *Remote sensing of Environment*, *144*, 152-171.	
Week 9: Spring Break	Mar 14
Week 10: GeoAI and Urban Sensing • Guest Speaker: Dr. Fan Zhang (MIT) • Read the paper in Week 11 for the discussion next week ➢ Janowicz, K., Gao, S., McKenzie, G., Hu, Y., & Bhaduri, B. (2020). GeoAI: spatially explicit artificial intelligence techniques for geographic knowledge discovery and beyond. *International Journal of Geographical Information Science*, 34(4), 625-636. ➢ Zhang, F., Zhou, B., Liu, L., Liu, Y., Fung, H. H., Lin, H., & Ratti, C. (2018). Measuring human perceptions of a large-scale urban region using machine learning. *Landscape and Urban Planning*, *180*, 148-160.	Mar 21
Week 11: Participatory GIS • Discuss the papers in class (led by assigned students) • Read the papers in Week 12 for the discussion next week • Paper 2 is assigned (due: April 18) ➢ Brown, G., Schebella, M. F., & Weber, D. (2014). Using participatory GIS to measure physical activity and urban park benefits. *Landscape and urban planning*, 121, 34-44.	Mar 28
Week 12: Geoprivacy • Guest Speaker: Dr. Bo Zhao (U of Washington) • Read the papers in Week 13 for the discussion next week ➢ Zhao, B., Zhang, S., Xu, C., Sun, Y., & Deng, C. (2021). Deep fake geography? When geospatial data encounter Artificial Intelligence. *Cartography and Geographic Information Science*, 48(4), 338-352.	Apr 4
Week 13: Geonarrative • Discuss the papers in class (led by assigned students) • The instructor introduces the final project ➢ Kwan, M. P., & Ding, G. (2008). Geo-narrative: Extending geographic information systems for narrative analysis in qualitative and mixed-method research. *The Professional Geographer*, *60*(4), 443-465. ➢ Bell, S. L., Phoenix, C., Lovell, R., & Wheeler, B. W. (2015). Using GPS and geo-narratives: a methodological approach for understanding and situating everyday green space encounters. *Area*, *47*(1), 88-96.	Apr 11
Weeks 14-15: Final Project	April 18

• Start and complete Final Project (due: May 7)	

Notes:

Labs: Each GIS lab is due one week after it is assigned. You can submit your old assignments if you took another GIS course with me. You are also encouraged to submit these assignments early.

Paper: Each paper is due 3 weeks after it is assigned.

Guest Speaker Event: The event is subject to change according to the speaker's availability.

Final Project: A reflection paper on critical GIS.