SSCI 572 (35624 and 35625), GIS and Landscape Architecture

Syllabus

Units: 2

Term Day Time: Fall 2024, Thursdays, 12:00 p.m. to 1:50 p.m. PT.

Location: AHF145A

Instructor: Guoping Huang, D.Des.
Office: AHF B57B
Office Hours: Wednesday 1:00 – 3:00 pm or by appointment via email.
Tuesday 10:30-11:30 (MLA Suite, 339A, Watt Hall)
Contact Info: guopingh@usc.edu, 213-740-5192 (zoom phone), see contact page on D2L Zoom Room

Library Help: Andy Rutkowski
Office: LIPA B40-A
Office Hours: Thu 10:00 a.m.-12:00 p.m. or by appointment
Contact Info: arutkows@usc.edu, see contact page on D2L for Zoom Room

IT Help: Myron Medalla
Office: AHF B56B
Office: By appointment via email
Contact Info: spatial_support@usc.edu, 213-740-4415

Course Description

This course explores the use of geographic information science, systems and services to support landscape architecture projects. The topics covered in this course are organized into three modules. The first will discuss the role of spatial thinking in design, the special characteristics of spatial information, and the vector and raster data models in spatial data representation. Data collection by using GPS, drone, and GIS apps will also be included in this module. The second module will introduce students to spatial analysis. By using a variety of analytical and modeling tools, students are expected to have a deep understanding of the socio-economic, physical, and ecological environments that are critical to landscape architecture. Building on top of the previous two modules, the third module explores the use of GIS in supporting design, especially 3D design of land, urban, and plant forms. Students will become familiar with the interoperability between GIS programs and design programs such as Grasshopper, Rhino, and CAD.

Modern-day GIS (geographic information systems) serve as systems of record, insight, and engagement and as a result, support the profession and practice of landscape architecture. This course will show how all of these systems complement one another and how GIS can promote and provide data-driven spatial analysis and modeling to support the design, approval, implementation, and performance assessment phases of landscape architecture projects that span multiple spatiotemporal scales.

Learning Objectives

Upon successful completion of this course, a student will be able to:

- Understand the iterative loop of evidence-based Geodesign approach.
- Identify the ways in which GIS can be used to support spatial thinking, analysis, modeling and mapping;
- Explain the special characteristics of spatial information and the raster and vector data models that are typically used to represent real-world phenomena;
- Describe the ways in which the built and social environments can be modeled using GIS;
- Describe the ways in which hydrological and ecological systems can be modeled using GIS;
- Use GPS and GIS apps to gather their own spatial information; and
- Employ spatial models and basic cartographic principles to communicate the results of landscape architecture projects and any associated research.
- Choose appropriate tools across a variety of programs to migrate data, maps and drawings for design while keeping spatial integrity.

Students may vary in their competency levels on these abilities. You can expect to acquire these abilities only if you honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations of you as a student.

Prerequisite(s): None
Co-Requisite(s): None

Class Conduct

Harassment, sexual misconduct, interpersonal violence, and stalking are not tolerated by the university. All faculty and most staff are considered Responsible Employees by the university and must forward all information they receive about these types of situations to the Title IX Coordinator. The Title IX Coordinator is responsible for assisting students with supportive accommodations, including academic accommodations, as well as investigating these incidents if the reporting student wants an investigation. The Title IX office is also responsible for coordinating supportive measures for transgender and nonbinary students such as faculty notifications, and more. If you need supportive accommodations you may contact the Title IX Coordinator directly (titleix@usc.edu or 213-821-8298) without sharing any personal information with me. If you would like to speak with a confidential counselor, Relationship and Sexual Violence Prevention Services (RSVP) provides 24/7 confidential support for students (213-740-9355 (WELL); press 0 after hours)

Diversity and Inclusion – It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful to everyone, and you are also expected to respect of others regardless of their race, ethnicity, gender identity and expressions, cultural beliefs, religion, sexual orientation, national origin, age, abilities, ideas and perspectives, or socioeconomic status. Your suggestions are encouraged and appreciated. Feel free to let me know ways to improve the effectiveness of the course for you personally or for other students.

Generative AI – Generative AI Tools such as ChatGPT, DALL-E, Bard, and others are now part of the cultural landscape. As in your professional lives, there will be times when using these tools is appropriate and others when there is more benefit to not using them. We will work together to determine the opportunities and responsibilities of using these tools. Some guideline principles in this course include:

· All work should be original and created specifically for the given assignment. You are responsible for the accuracy and originality of any material submitted.

· You should be the authors of all text submitted. In assignments that are collaborative in nature, that group of students will be the co-authors and have all associated responsibilities.

· Academic integrity policies regarding the use of generative AI tools will apply to every assignment.

· The extent to which using a generative AI tool is appropriate will be identified for specific assignments. Please note that such use may differ for each assignment.

· Any generative AI text should be treated as source material and should be appropriately cited. In other words, if someone else (or something else) wrote the text, a citation is necessary. You

will be asked to further cite not just the source, but how you used these tools. This extra step is reflective of future professional standards and responsibilities.

· Any generative AI image or graphic should be appropriately cited.

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposed other than individual or group study is prohibited. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which has been distributed to students or in any way has been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Technological and Communication Requirements

ArcGIS pro and ArcGIS Online are provided online via the GIST Server; hence, you do not need to install it on your own computer. Instead, every student must have the following technology requirements:

- A computer with a fast Internet connection.
- A functional webcam and a microphone for use whenever a presentation or meeting is scheduled.
- An up-to-date web browser to access the Server

If a student does not have access to any of these, please speak with the instructor at the start of the semester. Also, see the USC ITS Student Toolkit here: https://keepteaching.usc.edu/students/student-toolkit/

Brightspace– This course will utilize the Brightspace learning management system which allows students to access course content, upload assignments, participate in discussion forms, among other learning experiences. The Brightspace platform provides flexibility in the learning experience where students can participate in the course residentially or remotely, synchronously (meeting together at the same time) or asynchronously (accessing videos and course content outside of class).

SSI Server and Tech Support – This course utilizes the SSI Server which is a virtual desktop giving access to many different professional software. If you are unable to connect to the server or experience any type of technical issues, send an email using your USC account to SSI Tech Support at spatial_support@usc.edu, making sure to copy (cc) me on the email.

Communications – All assignments given and all materials to be handed in will be submitted via D2L. The instructor will also create and monitor discussion forums through which students can discuss issues and assignments as needed. Students should read all email sent from Brightspace or from course instructor(s) as soon as possible. Also, students who do not regularly use their USC email accounts should double-check to be sure that mail sent from both the Brightspace accounts and the instructor's account (noted above) to your USC account is forwarded to an address used regularly and does not go into junk mail. The instructor will endeavor to respond to all email within 24 hours of receipt, aiming for no more than 72 hours delay. In the rare case that an instructor is off-line for an extended period of time, an announcement will be posted to the class Brightspace site. Due to the synchronous and asynchronous nature of this course, it is each student's responsibility to stay informed and connected with others in our course. In addition to email, students are expectedto login to Brightspace regularly to check for announcements.

Discussion forums – On the Brightspace site, I will post a series of discussion threads relevant to various sections of the course. Discussions provide a key means for student-to-student discussion and collaboration that can replicate the face-to-face contact you may have experienced in traditional classrooms. Here students can provide support to each other while working on your assignments, sharing hints and helpful tips, as you would in a classroom laboratory. Please post your questions about assignments there, as you would ask them publically in the classroom. I monitor the discussion threads and offer comments when necessary, but more importantly, consider the discussion board a key way to connect with your classmates and share your discoveries.

Required Readings and Supplementary Materials

All of the readings listed below are available online through USC Libraries or in the weekly folders on the course D2L. There is no required textbook for this course.

- Bolstad, P. (2019). *GIS fundamentals: A first text on geographic information systems* (6th Ed.). Ann Arbor, MI: XanEdu Publishing [Ch. 2 only].
- Dangermond, J., & Goodchild, M. F. (2020). Building geospatial infrastructure. *Geospatial Information Science, 23*
- Miller, W. (2010). Introducing Geodesign: The concept. ESRI white paper, https://www.esri.com/library/whitepapers/pdfs/introducing-geodesign.pdf
- Downs, R. M. (1997). The geographic eye: Seeing through GIS? *Transactions in GIS, 2*, 111-121.
- Duckham, M. (2015). GI expertise. *Transactions in GIS, 19*, 499-515.

- Goodchild, M. F. (2010). Towards Geodesign: Repurposing Cartography and GIS?. Cartographic Perspectives, (66), 7–22. https://doi.org/10.14714/CP66.93
- Huang, G. (2017). Protecting Urban River Views with Geodesign Approach. *Journal of Digital Landscape Architecture*, Vol. 2: 85-93, http://dx.doi.org/10.14627/537629009
- Desimini, J., Waldheim, C. (Eds) (2016) Cartographic Grounds: Projecting the Landscape Imaginary, Princeton Architectural Press
- Parker, J., & Zingoni de Baro, M. E. (2019). Green infrastructure in the urban environment: A systematic quantitative review. *Sustainability, 11,* 3182.
- Robertson, C., & Feick, R. (2018). Inference and analysis across spatial supports in the big data era: Uncertain point observations and geographic contexts. *Transactions in GIS, 22*, 455-476.
- Stöglehnergernot, G. (2019). Conceptualizing quality in spatial planning. *Spatial Research & Planning, 77*(1), 1-15.
- Wilson, J. P. (2018). *Environmental applications of digital terrain modeling.* Oxford, UK: Wiley Blackwell
- Zuniga-Teran, A. A., Staddon, C. de Vito, L., Gerlak, A. K., Ward, S. Schoeman, Y., … Booth, G. (2020). Challenges of mainstreaming green infrastructure in built environment professions. *Journal of Environmental Planning & Management, 63*, 710-732.

Description and Evaluation of Assessments

This course includes a diversity of assessments that allow students to show their mastery of the material in a variety of ways. The different types of assessments are described below and their point value to final grades are listed in the following Grading Breakdown section.

Assignments

8 worth of 40 points. A set of 8 small assignments is spread across the semester. The tutorials that comprise these assignments will introduce the tools of scientific inquiry and give students practical experience in implementing these tools within the framework of the scientific method and typical landscape architecture settings. The assignments are linked to the lectures and class discussions, but do not duplicate the lecture experience.

The geographic analysis and mapping software and geospatial data required for these assignments will be accessed using virtual computing resources provided by the Spatial Sciences Institute. Please note that there is **no credit for late submissions.**

Mid-term Exam and Other Policies

1 worth of 15 points. The midterm exam is an open-book exam. This exam will cover critical concepts and theories learned during lectures in the first and second modules as well as in the course readings and assignments. **No make-up opportunities will be offered for the exam,** so

mark the appropriate date on your calendar! If you have a legitimate conflict, per the USC policy on Final Exam Scheduling, speak with me as soon as possible.

Projects

3 worth of 45 points. Projects are hands-on design exercises for students to accomplish independently without tutorials. Students are expected to use skills and knowledge learned during lectures, choose appropriate programs and tools to create expected outcomes within the Geodesign approach.   The final project will be developed in conjunction with the Second Year MLA Studio Arch 542a. Students are expected to use spatial data and analysis to not only contextualize their design, but also strengthen their design thinking and presentation.

Grading Breakdown

The table below shows the breakdown of the assessments and their contributions to the final grade. The emphasis is on regularly completing short assignments, as well as solid performance on the mid-term exam and all the projects.

Assessment	Number	Points Each	Total Points (% of Grade)
Assignments	8	5	40
Mid-term	1	15	15
Projects	2	10	20
Final project	1	25	25
Totals			100

Grading Scale

Assignments in this and other SSCI courses, are graded on the letter grade scale where A is exemplary, B is very good, C is satisfactory, D is unsatisfactory, and F needs improvement. Final grades use the same letter grade scale with C being the minimum passing grade for credit at the graduate level. The grading scale follows:

A	> 93 points		B-	80-82 points		D+	67-69 points
A-	90-92 points		C+	77-79 points		D	63-66 points
B+	87-89 points		C	73-76 points		D-	60-62 points
B	83-86 points		C-	70-72 points		F	<60 points

Assignment Submission Policy

Unless otherwise noted, assignments must be submitted via Brightspace by the due dates specified in the Course Schedule below and on the assignment instructions.

Unless otherwise noted, all Reading Assignments and Tutorials are *due by 11:59 pm Pacific Time (PT) on Mondays*. Project components have different due dates as indicated on the Course

Schedule below. Your attention to on-time assignment submission is essential if I am to meet my goal to return comments on your submitted assignments before the next one is due. Sometimes this is impossible, so I will post a notice on anticipated delays if needed.

Strict penalties apply for late assignments as follows:

- All assignments will be penalized 2 points up to FOUR days late. No points will be given for submissions more than FOUR days late. Note that all assignments worth 2 points will receive 0 points if submitted late.
- Additionally, no written work will be accepted for grading after 5 pm PT on the last day of classes.

Grading Timeline

My goal is to provide grading and feedback on each course assignment no later than one week after the assignment was submitted.

Learning Experience Evaluations

Please note Learning Experience Evaluations for the course take place at the end of the semester and are facilitated by the University. These evaluations provide an important review of student experiences in the course.

Schedule

Date	Topics	Readings	Deliverables/Due Dates
Week 1 8/29	Introduction What is GIS? What is Geodesign?	Dangermond & Goodchild (2020) Miller (2010) Goodchild (2010)	Assignment 1 Due by next Thursday
Week 2 9/5 *Monday, 9/2 is university holiday (Labor Day)	Spatial Data Models and Data Sources	Bolstad (2019), Ch. 2	Assignment 2 Due by next Thursday
Week 3 9/12	Characteristics of Spatial data Projection and coordinate system	Milly et al. (2008) Robertson & Feick (2018)	Assignment 3 Due by next Thursday

Week 4 9/19	Cartography and thematic mapping	Desimini & Waldheim (2016)	Assignment 4 Due by next Thursday
Week 5 9/26	What is spatial thinking and spatial analysis? Vector-based spatial analysis	Downs (1997); Duckham (2015)	Assignment 5 Due by next Thursday
Week 6 10/3	Raster-based spatial analysis		Assignment 6 Due by next Thursday
Week 7 *10/10-10/11 is university holiday (Fall Recess)	Fall recess		
Week 8 10/17	Mid-term Project planning		
Week 9 10/24	Spatial data acquisition: GPS, Lidar, and drone imagery		Assignment 7 Due by next Thursday
Week 10 10/31	Land Surface Parameters	Wilson (2018, Ch. 3 &4) Stöglehnergernot (2019)	Assignment 8 Due by next Thursday
Week 11 11/7	Automation: Spatial modeling for Green Infrastructure	Parker & Zingoni de Baro (2019); Perkl (2016); Zuniga-Teran et al. (2020)	Project 1: hydrologic analysis Due by next Thursday
Week 12 11/14 *Monday, 11/11 is university holiday	3D and urban design	Gorelic et al. (2017) Huang (2017)	Project 2: Urban design and viewshed analysis Due by next Thursday

(Veterans Day)			
Week 13 11/21	Web GIS Open Source GIS		Final project
Week 14 *11/27-11/29 is a university holiday (Thanksgiving)	Thanksgiving holiday, no class		
Week 15 12/5 Friday, 12/6 is the last day of class, 12/7-12/10 study days	Final project workshop		Final project TBD, by final review.
	Final Project Review. No Exam		

Statement on Academic Conduct and Support Systems

Academic Integrity

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic

Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - *(213) 740-9355 – 24/7 on call*

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - *988 for both calls and text messages – 24/7 on call*

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - *(213) 740-9355(WELL) – 24/7 on call*

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - *(213) 740-5086*

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - *(213) 740-5086 or (213) 821-8298*

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - *(213) 740-0776*

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - *(213) 740-0411*

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - *(213) 740-2101*

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - *UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - *UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call*

Non-emergency assistance or information.

Office of the Ombuds - *(213) 821-9556 (UPC) / (323-442-0382 (HSC)*

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - *(323) 442-2850 or* otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.

Resources for Online Students

The Course Brightspace page and the SSI Student Hub on Brightspace have many resources available for distance students enrolled in our graduate programs. In addition, all registered students can access electronic library resources through the link https://libraries.usc.edu/. Also, the USC Libraries have many important resources available for distance students through the link: https://libraries.usc.edu/faculty-students/distance-learners. These include instructional videos, remote access to university resources, and other key contact information for distance students.