

SSCI 201 (35712R), Principles of Geodesign

Syllabus

Units: 4

Term: Spring 2024

Lecture: Mondays and Wednesdays, 2:00 - 3:50 p.m.

Location: WPH 206

Instructor: Bitá Minaravesh, Ph.D.

Office: AHF B55D

Office Hours: Mondays and Thursdays, 1:00 - 2:00 p.m.

Contact Information: minarave@usc.edu

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Office: LIPA B40-A

Office Hours: By appointment via email

Contact Info: arutkows@usc.edu

IT Help: Myron Medalla

Office: AHF B56B

Office Hours: By appointment via email

Contact Info: spatial_support@usc.edu, 213-740-4415

Course Description

Geodesign is the science of designing geographic spaces to achieve sustainable and livable cities using iterative design processes. Geospatial technologies combined with geodesign processes can address a host of complex problems related to the environment, land use, urban development, and natural resource management. Geodesign draws its key concepts from a broad variety of domains including architecture, landscape architecture, urban planning, engineering and traditional sciences to provide more holistic and sustainable solutions. Geodesign emphasizes collaboration among various stakeholders, including policymakers, experts, and the people of the place) and focuses on outcomes that may help us to solve some of the Earth's most difficult and enduring problems, including those linked to population growth, lack of access to clean water, malnutrition, urbanization, ecosystem destruction and global warming, among others. These national and in many instances, global threats, can be tackled in numerous ways and the particular focus and value that geodesign affords is the ability to work at identifying and building solutions in an iterative fashion from the bottom up (i.e., the local and regional scales).

This course therefore starts by tracing the foundations and guiding principles of geodesign and how the practice of geodesign can be invoked and deployed to improve the functioning of the Earth, with the engagement of the people of the place that would be affected. Three sets of concepts and ideas are reviewed next. The first set focuses on the role of space and time scales and place-making in society. The second set focuses on the role of observation and mapping in learning about the world around us and the role of storytelling and maps in communicating this knowledge across diverse audiences. The third and final set looks at how the past informs the present and future and how many of the drivers and processes that shape our everyday lives span multiple spatiotemporal scales.

The class then moves to an in-depth exploration of the framework for geodesign that Carl Steinitz published in 2012. The role of architecture and landscape architecture as the traditional home for place-making and design, of planning as a framework for combining collective and individual action across the Earth, and of the spatial sciences as a framework for acquiring, organizing, analyzing, modeling and communicating location-based information are emphasized. This framework is helpful in classifying the variations in values attributed to environmental amenities and conditions (by different stakeholders) or variations in disciplinary perspectives (by different domains). This framework, in the broadest sense, envisages changing geography by design.

The class finishes up by reviewing several geodesign case studies from around the globe, and by doing so, lays out the foundation on which the upper division classes from architecture, planning and spatial sciences that comprise the Geodesign major are based.

Learning Objectives

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

- Discuss the myriad ways in which places can be constructed, interpreted, and experienced by different people.

- Synthesize the principles of geodesign and how these can be used as a force for good in building healthy, livable, and sustainable communities.
- Examine how urban and regional planning provides a framework for promoting civic engagement and collective action.
- Analyze how geographically referenced data can be gathered and organized to support a large number and variety of collaborative projects.
- Describe how geospatial data can be analyzed, modeled and visualized to inform design and planning; and by doing so, support public participation and urban and rural development.
- Analyze how form and function co-exist and evolve in urban and rural settings and how globalization connects near- and far-away places and actions.
- Synthesize how to integrate the content and research methods from architecture, urban and regional planning, the spatial sciences, and other disciplines relevant to specific situations.
- Discuss the broader context in which the research issues and the practice of geodesign are positioned.

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 class 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

Recommended Preparation: 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).

COVID-19 policy—Students are expected to comply with all aspects of USC's COVID-19 policy including, but not limited to, vaccination and indoor mask mandates. Failure to do so may result in

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removal from the class and referral to Student Judicial Affairs and Community Standards. Students are recommended to keep safe physical distancing, whenever possible, to prevent any possible transmission. Please contact your instructor if you have any safety concerns.

Diversity and Inclusion—It is my intent that students from all diverse backgrounds and perspectives be well served by this course. The diversity that students bring to this class will be viewed as a resource, strength and benefit. The learning needs of students will be addressed both in and out of class. It is my intent to present materials and activities that are respectful to everyone, and you as a student 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.

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 Proficiency and Hardware/Software Required

ArcGIS is provided online via the SSI 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 microphone for use whenever a presentation or meeting is scheduled
- An up-to-date web browser to access the SSI 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/>

Communications—All materials to be handed in will be submitted via Blackboard. It is each student's responsibility to stay informed about what is going on in the course. In addition to email about time-sensitive topics, many important announcements will be communicated in class and some but perhaps not all will be posted on the Announcement page in Blackboard. The expectations therefore are: (1) that you will attend each and every class session; and (2) that you will check the announcements each time you log onto Blackboard.

I will endeavor send via email through Blackboard any notices that are time sensitive. Please be sure that you read as soon as possible all email sent from Blackboard or from me. Do not ignore course email until the day before assignments are due. In addition, double check to be sure that email sent from the USC blackboard account does not go into your junk mail!

While I am usually on-line all day and will probably respond to emails from students very quickly, I will endeavor to respond to all email within 24 hours of receipt, aiming for no more than 72 hours delay. In the rare case when I expect to be off-line for more than 72 hours, I will post an announcement on the Blackboard site.

Required Readings and Supplementary Materials

Please acquire the text listed below. All are available at the USC Bookstore. All other supplementary readings listed in the syllabus are available as electronic resources in USC Libraries or under the tab marked "Readings" on the course Blackboard.

The required textbooks for this course are:

- Benyus, J. 2002. *Biomimicry: Innovation Inspired by Nature*. Random Books.
- Jacobs, J. 1961. *The Death and Life of Great American Cities*. Random House (Vintage Books edition, 1992).
- Leopold, A. 1949. *A Sand County Almanac: And Sketches Here and There*. Oxford University Press.
- McHarg, I. 1969. *Design with Nature*. Doubleday Books.
- Speck, J. 2012. *Walkable City*. North Point Press.
- Steinitz, C. 2012. *A Framework for Geodesign: Changing Geography by Design*. Esri Press.
- Wilson, E. O. 2016. *Half-Earth: Our Planet's Fight for Life*. Liveright.

Supplementary readings for this course are:

- Cochran, G., Harpending, H. 2009. *The 10,000-year explosion: How civilization accelerated human evolution*. Basic Books.
- Duany, A., Plater-Zyberk, E., Speck, J. 2000. *Suburban nation: The rise of sprawl and the decline of the American dream*. North Point Press.
- Goodchild, M.F. 2010. Towards geodesign: Repurposing cartography and GIS? *Cartographic Perspectives*, 66, 7-22.

- Hardin, G. 1968. The tragedy of the commons. *Science*, 162, 1243-1248.
- Hise, G., Deverell, W. 2000. *Eden by design: The 1930 Olmsted-Bartholomew plan for the Los Angeles region*. University of California Press.
- Inglehart, R., Welzel, C. 2005. *Modernization, cultural change, and democracy: The human development sequence*. Cambridge University Press.
- Kim, M. 2017. Teaching coastal resilience using geodesign: A study of Virginia Beach. *Journal of Digital Landscape Architecture*, 2, 279-286.
- Kurland, K.S. 2017. 3D and spatial analysis for smart and healthy cities. *Journal of Digital Landscape Architecture*, 2, 76-84.
- Lynch, K. 1960. *The image of the city*. Harvard University Press.
- Murtha, T., Wang, L., Duan, L. 2020. Historical analysis of land use change and geodesign of rapid urbanization: Orlando, Florida, USA. *Journal of Digital Landscape Architecture*, 4, 205-211.
- Saunders, W. 2012. *Designed ecologies: The landscape architecture of Kongjian Yu*. Birkhäuser.
- Schmidt-Hamburger, C., Zeile, P. 2023. Walking in the city: An experimental pedestrian stress test for Marienplatz in Stuttgart, Germany. *Journal of Digital Landscape Architecture*, 8, 372-380.
- Shearer, A.W. 2022. Expanding the use of scenarios in geodesign: Engaging uncertainty of the Anthropocene. *Journal of Digital Landscape Architecture*, 7, 472-486.
- Stremke, S., Oudes, D., Picchi, P. 2023. Revealing the power of landscape in mitigating the climate crisis. *Journal of Digital Landscape Architecture*, 8, 2-12.
- Taylor, K. 2014. Cities as cultural landscapes. In F. Bandarin & R. van Oers (Eds.), *Reconnecting the city: The historic urban landscape approach and the future of urban heritage* (pp. 179-202). John Wiley & Sons.
- Tulloch, D.L. 2019. Geohealth Meets geodesign: The multidisciplinary challenges of informing the regional design studio with human health research. *Journal of Digital Landscape Architecture*, 4, 300-307.
- Waltham, T., Sholji, I. 2001. The demise of the Aral Sea: An environmental disaster. *Geology Today*, 17(6), 218-228
- World Wildlife Foundation. 2022. *Effects of Climate Change*. <https://www.worldwildlife.org/threats/effects-of-climate-change>

Description and Valuation 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.

Exercises

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In addition to regular attendance and class participation, there is a set of four in-class exercises spread across the semester. These exercises may use pencils and (tracing) paper and will be designed to introduce you to the concepts and tools of geodesign as well as to give you practical experience in implementing these concepts and tools to explore various problems (and solutions) within the framework of geodesign. The primary goal of the exercises is to enable students to understand the value of spatial knowledge, maps, and the spatial representation of natural and human phenomena in design.

Reports

Throughout the semester, students will also produce five summaries of books or articles on foundations of geodesign used in class and how the readings have influenced their view of the role that planning, science, engineering, and design might play in solving the Earth's most serious and enduring challenges. Students should use these short writing assignments strategically to explore existing interests and build background knowledge for the story map project.

Story Maps

The final project in this course is a story map. Story maps convey information about places, issues, and trends by enriching digital maps with graphs, text, photographs, video, and audio. The underlying data often depict the coupling of social and natural systems. These data may describe things about the natural, built, and social environments, and may also include live data streams for phenomena, such as temperature, precipitation, and traffic. They often present scientific data and analysis, but they are mainly designed for the public and do not require their users to have special knowledge or skills related to Geographic Information Systems (GIS) for example.

Story maps are increasingly used in geodesign and are an important tool to describe the challenges faced in various parts of the world and pathways toward equity, sustainability, resilience, and improved human well-being. For example, you can see an interactive story map that describes land use footprints of megacities here:

<https://storymaps.arcgis.com/stories/a900831b442e43c79cf9eeb399d5440f>. This story map was created as part of the Smithsonian's series on *Living in the Anthropocene: The Age of Humans*. Another aspirational story map shows the state of the global climate in 2018, see <https://wmo.maps.arcgis.com/apps/Cascade/index.html?appid=855267a7dd394825aa8e9025e024f163>.

In this course, you will create a story map that is focused on one site in the great Los Angeles Metropolitan Region that is a candidate for geodesign intervention. Students will be divided into small teams (2-3 students per team) and these teams will prepare presentations that offer a critical review of the workflow and the geospatial concepts and tools that were used to synthesize scientific understanding. These story maps will be expected to integrate data on social and natural systems around the chosen geodesign case study. These story maps will also integrate scientific data like the examples above, but their primary focus will be the use of geodesign as concepts in story maps as a force for good at local or regional scales.

It will use visualization of data or models, like in the examples linked above, to communicate the

underlying principles of geodesign and how they were brought together and used in an attempt to solve the problem at hand.

Exams

The final exam is closed book and will include content from course readings, lectures, and in-class exercises. **No make-up opportunities will be offered for missed exams or in-class exercises**, so mark the appropriate dates on your calendars! If you have a legitimate conflict, speak with the instructor as soon as possible.

Grading Breakdown

The table below shows the breakdown of the assessments and their contributions to the final grade. The emphasis is on regularly completing a number of short assignments as well as solid performance on the story map work elements and the final examination.

Assessment	Number	Points Each	Total Points (% of Grade)
Exercises	4	6	24
Reports	5	6	30
Story Maps	1	10	10
Story Map Presentations	1	6	6
Final Exam (Closed book)	1	30	30
Totals	12	--	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. The grading scale is as 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 Blackboard by the due dates specified in the Course Schedule below and on the assignment instructions.

Strict penalties apply for late assignments as follows:

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- All assignments will be penalized 2 points up to seven days late. No points will be given for submissions more than seven days late.
- Additionally, no written work will be accepted for grading after 5 p.m. PT on the last day of classes.

Schedule

Modules

1	Guiding Principles
2	Geodesign Frameworks
3	Global, Regional, and Local Geodesign Applications

	Date	Topics	Readings	Deliverables/Due Dates and Times
	Week 1 1/8	Introduction to Course		
	1/10	Introduction to Geodesign	Flaxman (2009) Miller (2012)	
	Week 2 1/15	<i>Martin Luther King Jr. Day</i>		
	1/17	Antecedents of Geodesign	Lynch (1960) Jacobs (1961) Hise & Deverell (2000)	
	Week 3 1/22	Steinitz's Geodesign Framework	Steinitz (2012) Kim (2017)	
	1/24	Geodesign Building Blocks	McHarg (1969) Steinitz (2012), Ch. 1-2)	
	Week 4 1/29	Exercise #1 – Group Presentations		Exercise #1 due 1/31, 11:59 p.m.
	1/31	Exercise #1 – Group Presentations		
	Week 5 2/5	The People of the Place	Steinitz (2012, Ch. 3-4)	Report #1 due 2/7, 11:59 p.m.
	2/7	Sketching the Natural World	Leopold (1949)	
Week 6 2/12	Charting the Evolution of Human Civilization	Leopold (1949)	Report #2 due 2/14, 11:59 p.m.	
2/14	Mapping Modernization and Prosperity	Cochran & Harpending (2009, Ch. 1-2)		
Week 7 2/19	<i>President's Day</i>			
2/21	The Ascent of Globalization and City Regions	Hardin (1968) Inglehart & Welzel (2005, pp. 15-47 Taylor (2014)		
Week 8 2/26	The Rise of Imminent Threats and Challenges	Duany et al. (2000) Waltham & Sholii (2001) World Wildlife Foundation (2022)	Report #3 due 2/28, 11:59 p.m.	
2/28	Maps and Map Overlay	Goodchild (2010) Steinitz (2012, Ch. 3-4)		

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Week 9 3/4	Models Data Uncertainty	Shearer (2022)	Exercise #2 due 3/6, 11:59 p.m.
3/6	Global – Climate Change	World Wildlife Federation (2022) Stremke et al. (2023)	
Spring Recess			
Week 10 3/18	Global – Population Growth and Resource Scarcity	Waltham & Sholji (2001) Murtha et al. (2020)	
3/20	Global – Biodiversity	Wilson (2016) World Wildlife Federation (2022)	
Week 11 3/25	Global – Public Health	Kurland (2017) Tulloch (2019)	Exercise #3, due 3/27, 11:59 p.m.
3/27	Regional – Nature Services	Saunders (2012)	
Week 12 4/1	Regional – Walkable Cities	Speck (2012) Schmidt-Hamburger & Zeile (2023)	Exercise #4 due 4/3, 11:59 p.m.
4/3	Local – Homelessness		
Week 13 4/8	Local – Biomimicry	Benyus (2002)	Report #4 due 4/10, 11:59 p.m.
4/10	Local – Urban Redevelopment and River Landscape Planning	Gottwald et al. (2021)	
Week 14 4/15	Field Trip		Report #5 due 4/17, 11:59 p.m.
4/17	Story Map Working Session		
Week 15 4/22	Group Story Map Presentations		<i>Story Map due 4/22 by start of class</i>
4/24	Group Story Map Presentations / Final Exam Review		
Final Exam – May 6, 2024, 2:00 – 4:00 pm PT			

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.