USC Dornsife
Dana and David Dornsife
College of Letters, Arts and Sciences
Spatial Sciences Institute

SSCI 201, Principles of Geodesign

Syllabus

Units: 4

Term Day Time: Fall 2021, Monday and Wednesday 12:00 – 1:50 p.m.

Location: CPS 211

Instructor: Leilei Duan, Ph.D.
Office: AHF B55J
Office Hours: Monday 2:00 – 3:00 p.m. PT and Thursday 10:30 – 11:30 a.m. PT, and by appointment via email.
Contact Info: leileidu@usc.edu, 213-740-6532 (office), see contact page on Blackboard for Zoom Room

Library Help: Andy Rutkowski
Office: VKC 36B
Office Hours: Thu 10 a.m.-12 p.m.
Contact Info: arutkows@usc.edu, see contact page on Blackboard for Zoom Room

IT Help: Richard Tsung
Office: AHF 145D
Office Hours: By appointment
Contact Info: spatial_support@usc.edu, 213-821-4415

Course Scope and Purpose

Geodesign is a relatively new and emerging interdisciplinary field that draws key concepts and ideas from the fields of architecture, planning, and the spatial sciences. Geodesign links and integrates these fields in new and exciting ways in hopes of improving the world around us by executing one project at a time. The field stresses engagement (including policymakers, experts, and the people of the place for example) and focuses on outcomes that may help us to solve some of the Earth's most difficult and enduring problems, such as 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 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 Outcomes

On completion of this course students 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 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, spatial sciences, and other disciplines relevant to a particular situation.
- 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 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)

Technological and Communication Requirements

Students will be introduced to geospatial technologies by utilizing Esri services and products. This course will use ArcGIS Online (AGOL) to examine spatial data, and to perform final project analysi. The modeling software and geospatial data required for course assignments will be accessed using computing resources provided by the Spatial Sciences Institute.

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/

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 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 our course. In addition to email about time-sensitive topics sent via Blackboard, any important announcements will be posted on the Announcement page in Blackboard. Be sure to check these each time you log onto Blackboard.

Do not ignore course email until the day before assignments are due. Also double check to be sure that email sent from the USC blackboard account does not go into your junk mail!

I am regulary on-line all day and will respond to emails from students 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 texts listed below. All are available at the USC Bookstore. All other supplementary reading 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.* New York, NY: Random Books.
- Jacobs, J. (1961). *The Death and Life of Great American Cities.* New York, NY: Random House (Vintage Books edition, 1992).
- Leopold, A. (1949). *A Sand County Almanac: And Sketches Here and There.* New York, NY: Oxford University Press.
- McHarg, I. (1969). *Design with Nature.* New York, NY: Doubleday Books.
- Speck, J. (2012). *Walkable City.* New York, NY: North Point Press.
- Steinitz, C. (2012). *A Framework for Geodesign: Changing Geography by Design.* Redlands, CA: Esri Press.
- Wilson, E. O. (2016). *Half-Earth: Our Planet's Fight for Life.* United States: 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.* New York, NY: North Point Press.
- Forman, R. (1996). *Land Mosiacs.* Cambridge, MA: Harvard University Press.
- Goodchild, M.F. (2010). Towards Geodesign: Repurposing Cartography and GIS? *Cartographic Perspectives, 66,* 7-22.
- Hise, G., & Deverell, W. (2000). *Eden by Design: The 1930 Olmsted-Bartholomew Plan for the Los Angeles Region.* Berkeley, CA: 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,* 279-286.
- Lynch, K. (1960). *The Image of the City*. United Kingdom: Harvard University Press.
- Reisner, M. (1986). *Cadillac Desert*. New York, NY: Viking Press.
- Saunders, W. (2012). *Designed Ecologies: The Landscape Architecture of Kongjian Yu*. Berlin, Germany: Birkhäuser.
- Sterman, J.D. (2002). All models are wrong: Reflections on becoming a systems scientist. *System Dynamics Review, 18*(4), 501-531.
- Waltham, T., & Sholji, I. (2001). The demise of the Aral Sea: An environmental disaster. *Geology Today, 17*(6), 218-228
- World Wildlife Foundation, *Effects of Climate Change*. Retrieved from https://www.worldwildlife.org/threats/effects-of-climate-change

Description and Assessment of Assignments

Exercises

In addition to regular attendance and class participation, there is a set of four in-class exercises spread across the semester. These exercises will 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 and design might play in solving some of 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 Map

The final project in this course is a story map. Story maps tell about places, issues, and trends by enriching digital maps with content like various kinds of graphs, text, photographs, video, and audio. The underlying data often depict the coupling of social and natural systems. These may be things like wetland areas, land cover, and census data, and may also include live data streams such as temperature, precipitation, and traffic. They often present scientific data and analysis, but they are mainly designed for the general public and do not require their users to have special knowledge or skills with the use of 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 sustainability 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 example 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 of the selected sites in the great Los Angeles area that are suitable for geodesign intervention. Students will be divided into small teams (2-4 students per team) and these teams will prepare presentations that offer a critical review of the workflow and the spatial 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 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 following table shows the breakdown of the assignments 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 presentation and the final examination.

Assessment	Number	Points Each	Total Points (% of Grade)
Exercises	4	6	24
Reports	5	6	30
Final Project: Story Map and give oral report	1	16	16
Final Exam	1	30	30
Total	12	-	100

Course Schedule: A Weekly Breakdown

	Topic	Readings and Assignments	Deliverables/Due Dates
Module 1 Guiding Principles of Geodesign			
Week 1			
8/23	Introduction to Course	Leopold (1949)	No deliverables
8/25	What is Geodesign – General Concept	Leopold (1949) Report #1	
Week 2			
8/30	Sketching the Natural World	Cochran & Harpending (2009, Ch. 1)	No deliverables
9/1	Charting the Evolution of Human Civilization	Cochran & Harpending (2009, Ch. 2)	
Week 3			
9/6*	*No class – University Holiday	Inglehart & Welzel (2005) p.15-47	
9/8	Mapping Modernization and Prosperity	Articles provided on Blackboard. Report #2	Report #1 is due in Bb by 12:00 p.m. on Wednesday, 9/8
Week 4			
9/13	The Ascent of Globalization and City Regions	Steinitz (2012, Ch. 1 & 2)	

	Topic	Readings and Assignments	Deliverables/Due Dates
9/15	Understanding Imminent Threats and Challenges	Jacobs (1961)	Report #2 is due in Bb by 12:00 p.m. on Wednesday, 9/15
Module 2 Framework of Geodesign			
Week 5			
9/20	Antecedents of Geodesign	Exercise #1	
9/22	What is (Not) Geodesign – In Depth Understanding	McHarg (1969)	
Week 6			
9/27	Design with Nature	Forman (1996)	Exercise #1 is due in Bb by 12:00 p.m. on Monday, 9/27
9/29	Maps and Map Overlay	Steinitz (2012, Ch. 3 & 4) Exercise #2	
Week 7			
10/4	Understanding the Design with Nature	Steinitz (2012, Ch. 5 & 6); Articles provided on Blackboard.	
10/6	The People of the Place	Steinitz (2012, Ch. 7, 8, & 9) Report #3	Exercise #2 is due in Bb by 12:00 p.m. on Wednesday, 10/6
Week 8			
10/11	Steinitz' Geodesign Framework	Articles provided on Blackboard.	
10/13	Geodesign Exercise #3	Articles provided on Blackboard.	Report #3 is due in Bb by 12:00 p.m. on Wednesday, 10/13
Week 9			
10/18	Geodesign Exercise #4	Articles provided on Blackboard.	

	Topic	Readings and Assignments	Deliverables/Due Dates
10/20	Global Geodesign Challenges – Climate Change	Articles provided on Blackboard.	Exercise #3 due in Bb by 12:00 p.m. on Wednesday, 10/20
Module 3 Geodesign in Actions			
Week 10			
10/25	Global Geodesign Challenges – Population Growth and Resource Scarcity	Articles provided on Blackboard.	
10/27	Global Geodesign Challenges – Biodiversity	Articles provided on Blackboard.	Exercise #4 due in Bb by 12:00 p.m. on Wednesday, 10/27
Week 11			
11/1	Regional Geodesign Challenges – Public Health	Speck (2012) Report #4	
11/3	Regional Geodesign Challenges – Designed Ecology	Saunders (2012)	
Week 12			
11/8	Regional Geodesign Challenges – Walkable City	Speck (2012) Report #5	Report #4 is due in Bb by 12:00 p.m. on Monday, 11/8
11/10	Local Geodesign Challenges – Drought	Articles provided on Blackboard.	
Week 13			
11/15	Local Geodesign Challenges – Homelessness	Benyus (2002)	
11/17	Geodesign Innovations	Benyus (2002)	Report #5 is due in Bb by 12:00 p.m. on Wednesday, 11/17
Week 14			
11/22	Field trip to downtown LA	Benyus (2002)	
11/24*	*No class – University Holiday		
Week 15			

	Topic	Readings and Assignments	Deliverables/Due Dates
11/29	Student Story Map Presentations		Story Map Due at Class and Submit to Bb by 12:00 p.m. on Monday, 11/29
12/1	Student Story Map Presentations and Final Exam Review		
***12/4 – 12/7 Study Days**			
	Final Examination Friday, Dec 10, 11am-1pm (Closed Book)		

Assignment Submission and other Policies

Assignments must be submitted via Blackboard by the due dates specified in the Course Schedule. Attention to on-time assignment submission is essential. The instructors will aim to return feedback before the next assignment is due.

Strict penalties apply for late assignments as follows:

- Late assignments will not be accepted not graded.
- **Absences from class sessions** must be requested by sending an email to the instructor. Excused absences from class sessions will be granted only for valid reasons; please notify us of the reason for your absence in your email.

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards https://policy.usc.edu/files/2020/07/SCampus-Part-B-1.pdf. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems

Counseling and Mental Health– (213) 740-9355 – 24/7 on call
engemannshc.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline – 1 (800) 273-8255 – 24/7 on call
www.suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-9355(WELL), press "0" after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) – (213) 740-5086 |Title IX Compliance – (213) 821-8298
equity.usc.edu, titleix.usc.edu
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
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity | Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs – (213) 740-0776
dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention – (213) 821-4710
campussupport.usc.edu
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC – (213) 740-2101
diversity.usc.edu
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
dps.usc.edu, emergency.usc.edu
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) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.