

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, 2020, Monday and Wednesday,
12:00 - 1:50 p.m.

Location: VPD 105 & Online

Instructor: Leilei Duan, Ph.D.

Office: AHF B55J

Office Hours: Monday 10:30 – 11:30 a.m., Wednesday 9:00
– 10:00 a.m. Also available by appointment via email.

Contact Info: leileidu@usc.edu, 213-740-6532 (office),

Library Help: Andy Rutkowski

Office: VKC 36B

Office Hours: Tuesdays, 10:00 a.m.-12:00 p.m. and
Thursdays, 4:30-5:30 p.m. PT

Contact Info: arutkows@usc.edu, 213-740-6390,
<http://bit.ly/andyhangout>

IT Help: Richard Tsung

Office: AHF 145D

Office Hours: By appointment

Contact Info: ctsung@usc.edu, 213-821-4415 (office)

Course Description

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, and links and integrates them 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 scientific 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

On completion of this course students will be able to:

- Synthesize 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.

- Analyze 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.
- Analyze 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.
- Synthesize the broader context in which the research issues and the practice of geodesign are positioned.

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).

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:

- Bandarin, F., & van Oers R. (Eds.) (2014). *Reconnecting the City: The Historic Urban Landscape Approach and the Future of Urban Heritage*. Oxford, UK: Wiley-Blackwell.
- Bassett, T.J., & Fogelman, C. (2013). Déjà vu or something new? The adaptation concept in the climate change literature. *Geoforum*, 48, 42-53.
- 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 Mosaics*. Cambridge, MA: Harvard University Press.
- Goodchild, M.F. (2010). Towards Geodesign: Repurposing Cartography and GIS? *Cartographic Perspectives*, 66, 7-22.
- 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.
- 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.
- Tulloch, D. (2017). Toward a working taxonomy of geodesign practice. *Transactions in GIS*, 21(4), 635-646.
- 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

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

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 six 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: <http://storymaps.esri.com/stories/2014/growth-of-cities/>. 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 on the one hand and to prepare and communicate one or more plans or designs for addressing the problem or challenge on the other hand. 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.

Please note as well that some of the story maps you may see on the web are simply a montage of geotagged photographs and that your story map will be much more than this. It may have maps or photos for context, but it must be primarily an analytical report that includes writing in pop-up windows and sidebars. 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 and Other Policies

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

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. Assignments must be submitted as noted, typically on the course Blackboard (Bb) site.

Assessment	Number	Points Each	Total Points (% of Grade)
Exercises (Submit in class & on Bb)	4	6	24
Reports (Submit in class & on Bb)	4	6	24
Final Project: Story Map (Submit URL to Bb) and give oral report	1	16	16
Final Exam (Closed Book)	1	36	36
Total	10	-	100

Course Schedule: A Weekly Breakdown

	Topic	Readings and Assignments	Deliverables/Due Dates
Module 1 Fundamental concepts and knowledge of geodesign			
Week 1			
8/17	Introduction to Course	Leopold (1949)	

	Topic	Readings and Assignments	Deliverables/Due Dates
8/19	What is Geodesign – General Concept	Leopold (1949); Steinitz (2012, Ch. 1 & 2) Report #1	
Week 2			
8/24	Sketching the Natural World and the Evolution of Human Civilization	Cochran & Harpending (2009), Ch. 1-2	
8/26	Mapping Modernization and Globalization	Inglehart & Welzel (2005) p.15-47	Report #1 is due in Bb by 12:00 p.m. on Wednesday, 8/26
Week 3			
8/31	Understanding Imminent threats and challenges	Bassett, T.J., & Fogelman, C. (2013); Waltham, T., & Sholji, I. (2001)	
9/2	What is (Not) Geodesign – In Depth Understanding	Jacobs (1961)	
Week 4			
9/7*	No class – Labor Day		
9/9	Antecedents of Geodesign	Jacobs (1961); McHarg (1969) Exercise #1	
Week 5			
9/14	Maps and Map Overlay	McHarg (1969) Exercise #2	
9/16	Understanding the Design with Nature	Forman (1996) Exercise #3	Exercise #1 is due in Bb by 3:00 p.m. on Wednesday, 9/16
Week 6			
9/21	The People of the Place	Steinitz (2012, Ch. 3 & 4)	
9/23	Nature of Geodesign	Steinitz (2012, Ch. 5 & 6)	
Week 7			

	Topic	Readings and Assignments	Deliverables/Due Dates
9/28	Steinitz' Geodesign Framework	Steinitz (2012), Ch. 7, 8, & 9s	
9/30	Models and Data in Geodesign	Articles provided on Blackboard. Report #2	Exercise #2 is due in Bb by 12:00 p.m. on Wednesday, 9/30
Week 8			
10/5	Geodesign Exercise #3	Articles provided on Blackboard.	
10/7	Geodesign Exercise #4	Articles provided on Blackboard.	Report #2 is due in Bb by 12:00 p.m. on Wednesday, 10/7
Module 2 Geodesign challenges at different scales			
Week 9			
10/12	Global Geodesign Challenges – Climate Change	Tulloch, D. (2017)	
10/14	Global Geodesign Challenges – Population Growth and Resource Scarcity	Articles provided on Blackboard.	Exercise #3 due in Bb by 12:00 p.m. on Wednesday, 10/14
Week 10			
10/19	Global Geodesign Challenges – Biodiversity	Articles provided on Blackboard. Report #3	
10/21	Regional Geodesign Challenges – Designed Ecology	Saunders (2012)	Exercise #4 due in Bb by 12:00 p.m. on Wednesday, 10/21
Week 11			
10/26	Regional Geodesign Challenges – Smart City	Kim, M. (2017)	
10/28	Regional Geodesign Challenges – Walkable City	Speck (2012) Report #4	Report #3 is due in Bb by 12:00 p.m. on Wednesday, 10/28
Week 12			

	Topic	Readings and Assignments	Deliverables/Due Dates
11/2	Local Geodesign Challenges – Homelessness	Articles provided on Blackboard.	
11/4	Geodesign Innovations	Benyus (2002)	Report #4 is due in Bb by 12:00 p.m. on Wednesday, 11/4
Week 13			
11/9	Virtual Field trip to Downtown LA		
11/11	Student Story Map Presentations		Story Map Due at Class and Submit to Bb by 12:00 p.m. on Wednesday, 11/11
Final Examination (Time and date TBD)			

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” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems

Student Counseling Services (SCS) – (213) 740-7711 – 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

Provides 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) 740-4900 – 24/7 on call
engemannshc.usc.edu/rsvp

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

equity.usc.edu, titleix.usc.edu

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic that may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support – (213) 740-2421

studentaffairs.usc.edu/bias-assessment-response-support

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation 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.

Student Support and Advocacy – (213) 821-4710

studentaffairs.usc.edu/ssa

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

Provides safety and other updates, 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.