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, 2017, TTh-10:00-11:50 a.m.

Location: THH 102

Instructor: Darren Ruddell, Ph.D. GISP
Office: AHF B57F
Office Hours: Mondays, 1:00-2:00 p.m. and Wednesdays, 11:00 a.m.-12:00 p.m. PT, and by appointment via email.

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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

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:

- 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.
- McElvaney, S. (2012). *Geodesign: Case Studies in Regional and Urban Planning.* Redlands, CA: Esri Press.
- Steinitz, C. (2012). *A Framework for Geodesign: Changing Geography by Design.* Redlands, CA: Esri Press.

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.
- Benyus, J. (2002). *Biomimicry: Innovation Inspired by Nature.* New York, NY: Random 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. (2011). 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.
- Lynch, K. (1960). *The Image of the City.* Cambridge, MA: MIT Press.
- McHarg, I. (1969). *Design with Nature.* New York, NY: Doubleday Books.
- Michigan State University. (2016). *RUSLE Online Erosion Assessment Tool.* Retrieved from http://www.iwr.msu.edu/rusle/.
- Moss, R. H., Edmonds, J.A., Hibbard, K.A., Manning, M.R., Rose, S.K., van Vuuren, D.P., …, & Wilbanks, T. J. (2010). The next generation of scenarios for climate change research and assessment. *Nature, 463,* 08823.
- Mumford, L. (1989). *The City in History: Its Origins, Its Transformations, and Its Prospects.* Orlando, FL: Harcourt.
- Reisner, M. (1986). *Cadillac Desert*. New York, NY: Viking Press.
- Saunders, W. (2012). *Designed Ecologies: The Landscape Architecture of Kongjian Yu*. Berlin, Germany: Birkhäuser.
- Speck, J. (2002). *Walkable City.* New York, NY: North Point Press.
- 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

Description and Assessment of Assignments

Students must attend all regularly scheduled lectures/in-class exercises, write book summaries, write a policy essay, sit for a final examination, and produce and present a final project called a "story map."

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.

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.

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 warming of European cities as predicted in global climate models (see: http://storymaps.esri.com/stories/2012/warming-cities/).

In this course, you will create a story map that is focused on one of the geodesign case studies in McElvaney (2012). 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, in-class exercises, and online discussions sessions. **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. 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)	6	6	36
Final Project: Story Map (Submit URL to Bb) and give oral report	1	10	10
Final Exam (Closed Book)	1	30	30
Total	12	-	100

Course Schedule: A Weekly Breakdown

	Topic	Readings and Assignments	Deliverables/Due Dates
Week 1			
8/22	Introduction to Course		
8/24	Sketching the Natural and Human World	Leopold (1949), Jacobs (1961), Mumford (1989)	
Week 2			
8/29	Fusing Form and Function: Watersheds and Cities	Leopold (1949), Lynch (1960), Duany et al. (2000)	
8/31	Maps	Goodchild (2011)	Report #1 is due in Bb by 10:00 a.m. on Thursday, 8/31
Week 3			
9/5	Map Overlay	McHarg (1969)	
9/7	Landscape Metrics	Forman (1996)	Report #2 is due in Bb by 10:00 a.m. on Thursday, 9/7

	Topic	Readings and Assignments	Deliverables/Due Dates
Week 4			
9/12	Los Angeles Mass Transit Map Overlay Exercise (#1)		
9/14	Models	Sterman (2002), Moss et al. (2010), Bassett & Fogelman (2013)	Exercise #1 is due in Bb by 10:00 a.m. on Thursday, 9/14
Week 5			
9/19	Soil Conservation Model Exercise (#2)	Michigan State University (2016)	
9/21	Looking Forward and Backward: The Role of Culture, History, and Heritage	Bandarin & van Oers (2014)	Exercise #2 is due in Bb by 10:00 a.m. on Thursday, 9/21
Week 6			
9/26	The Importance of Scale and Multiscalar Interactions	Waltham & Sholji (2001)	
9/28	Role of Collaboration, Geography, and Questions and Iterations in the Practice of Geodesign	Steinitz (2012, Ch. 1, 2, & 3)	Report #3 is due in Bb by 10:00 a.m. on Thursday, 9/28
Week 7			
10/3	Part 1, Scoping the Geodesign Study	Steinitz (2012, Ch. 4)	
10/5	Part 2, Designing the Study Methodology: Role of Decision, and Impact Models	Steinitz (2012, Ch. 5, pp. 45-53)	
Week 8			
10/10	Case Studies: Geodesign with Certainty and Uncertainty	Steinitz (2012, Ch. 7, 8, & 9)	
10/12	Role of Change, Evaluation, Process and Representation Models	Steinitz (2012, Ch. 5)	Report #4 is due in Bb by 10:00 a.m. on Thursday, 10/12
Week 9			

	Topic	Readings and Assignments	Deliverables/Due Dates
10/17	Quantitative Impact Modeling vs. Qualitative Assessment	TBD	
10/19	Carrying Out the Geodesign Study	Steinitz (2012, Ch. 6)	Story Map Proposal due in Bb by 10:00 a.m. on Thursday, 10/19
Week 10			
10/24	Geodesign Exercise (#3) Stakeholder Engagement		
10/26	Geodesign Exercise (#4) Negotiations in Geodesign		Exercise #3 due in Bb by 10:00 a.m. on Thursday, 10/26
Week 11			
10/31	Guest Speaker: The Practice of Geospatial Science	TBD	
11/2	Guest Speaker: The Practice of Design	TBD	Exercise #4 due in Bb by 10:00 a.m. on Thursday, 11/2
Week 12			
11/7	Los Angeles Perspectives: Cadillac Desert	Reisner (1986)	
11/9	Los Angeles Perspectives: Eden by Design	Hise and Deverell (2000)	
Week 13			
11/14	Designed Ecologies	Saunders (2012)	Report #5 is due in Bb by 10:00 a.m. on Tuesday, 11/14
11/18	Biomimicry: Innovation Inspired by Nature	Benyus (2002)	
Week 14			
11/21	The Walkable City	Speck (2012)	Report #6 is due in Bb by 10:00 a.m. on Tuesday, 11/21
11/23	Thanksgiving Holiday (No Class)		

	Topic	Readings and Assignments	Deliverables/Due Dates
Week 15			
11/28	Student Story Map Presentations		Story Map Due at Class (Hard Copy) and Submit to Bb by 10:00 a.m. on Tuesday, 11/28
11/30	Student Story Map Presentations		
Week 17			
12/12	**Final Examination (8-10 a.m.) (Closed Book at our Regular Classroom)**		

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 Section 11, *Behavior Violating University Standards* https://policy.usc.edu/student/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.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* http://equity.usc.edu or to the *Department of Public Safety* http://adminopsnet.usc.edu/department/department-public-safety. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Relationship and Sexual Violence Prevention Services* http://engemannshc.usc.edu/rsvp/ provides 24/7 confidential support, and the sexual assault resource center webpage http://sarc.usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information*

http://emergency.usc.edu will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Academic Accommodations

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP and it should be delivered to me early in the semester. DSP is located in STU 301 and is open from 8:30am to 5:00pm, Monday through Friday (213-740-0776; study@usc.edu).