SSCI 499, Special Topics

Changing Our Global Infrastructure: An International Collaborative Geodesign Studio

Syllabus

Units: 4

Term—Day—Time: Fall Semester, Wednesdays and Fridays, 9:00 to 10:50 a.m.

Location: AHF B145D

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Course Description

This course provides a global perspective of geodesign and serves as an elective course for the B.S. in Geodesign program. Approximately 80 universities from around the world will examine a range of local challenges and problems spread across 10 knowledge domains (transportation, housing, green infrastructure, etc.) using a suite of common assumptions and methods in Fall Semester, 2018 and many of these groups will present their findings at a workshop to be convened as part of the 10th Geodesign Summit to be held in Redlands, CA in January, 2019.

This global project is led by an informal coordinating committee which is chaired by Tom Fisher (University of Minnesota) and includes Bill Miller (WRM Design), Brian Orland (University of Georgia), Ryan Perkl (Esri), and Carl Steinitz (Geodesignhub). Below we describe the rationale, unique elements, and expectations for participating in this global project.

Rationale

The rationale incorporates multiple threads. The first is that the world is facing serious problems which need complex responses. While each country, province and municipality has its own subset or flavor of these problems, there are many we share, and we will all benefit from sharing our responses. To match the scale of the problems, meaningful responses will have to address and be tested against longer timeframes than normal political and financial cycles. Responses have to be plausible but not necessarily precisely tuned to current predictions. Solutions are not likely to be directly implementable but they need to identify actions that could lead to implementation. The political processes and public opinion need understandable images and analyses before they will move towards ideas of the size, scope and scales that will be required.

Almost every university in the world already studies these issues and is (or should be) in a position to propose changes to our normal everyday practices. Yet every university and every unit of government acts in its own set of geographies and societies, and with its own content, definitions, methods, languages, color codes, and representation techniques. It is extremely difficult to compare across institutions to learn from each other. This collaboration proposes a radical increase in sharing and in the standardization of communication so that sharing, comparison and mutual learning can take place much more easily.

The project coordinating committee further believes that the key aspect of effective collaboration and eventual action is and will be public understanding of complex issues, and that this can be done without professional jargon, artistic obscurity and scientific myopia.

The overarching goal for this endeavor is bold. The various members of the project coordinating committee believe that there is a need for a large number of people – perhaps 10,000 – in the next decade who are educated broadly about the state of the world and specifically about the analytic and synthetic needs of places in order to propose change for the betterment of society and the environment in the face of likely global disaster. The most efficient way is to educate today's university students in these

matters and to do it in a manner that enables collaboration and mutual learning inside the university, and across institutions and nations. We share this vision and the hope that our geodesign graduates will contribute to the betterment of society and the environment in the years ahead.

Unique Elements

This course will incorporate seven unique elements as follows:

Shared Workflows, Technologies, and Outcomes – The collaboration will require a shared geodesign workflow, tutorials and access to relevant, available and linkable technologies, and a general schedule of activities and expected products.

Shared Change and Context Systems – Each of the projects will incorporate 10 change systems (green infrastructure; water infrastructure; gray infrastructure; energy; agriculture; industry; housing (lower density); housing (mixed/higher density); institutional; and one of our own choice) and several context systems (ocean; water; forest; urban; hazards) if appropriate.

Shared Sets of Prescribed Policy Innovations and Trends – The project teams will be provided with prescribed sets of policy innovations and trends for each of the 10 change systems and their contexts. These would be listed, described, and represented in two time scales – Version 1 will cover innovations which are immediately available for inclusion in the designs, and Version 2 are innovations which are forecast to be available for widespread adoption and use from 2030 onwards.

Shared Time Scales and Scenarios – The study area will be designed and represented in three time periods for each of three scenarios. The study area will be described as it was in the past or present and for two future periods – 2020 to 2035 to 2050, the target year of the Paris Climate Agreement. A "No Change" scenario will assume that there will be no change from current policies and project practices between 2020 and the final study date. A "Late Adopters" scenario will assume that there will be no change in the first time stage (2020-2035) and that the first part of the innovation policies and accompanying projects will be utilized in the second time stage (2035-2050). An "Early Adopters" scenario will assume that the first part of the innovation policies and projects will be utilized from 2020 to 2035 and that the second part of these innovative policies and projects will be utilized from 2035 to 2050.

Local Adaptation – We have chosen three squares measuring 5, 2 and 1 km on a side with the northwest corners specified by -118.2146 / 34.092600, -118.2146 / 34.070270, and -118.2146 / 34.062834 degrees of longitude and latitude (WGS84), respectively. These squares include the USC Health Sciences Campus and cover parts of three Los Angeles City neighborhoods (Boyle Heights, El Sereno, and Lincoln Heights) and some unincorporated areas in Los Angeles County. We will be able to define locally relevant criteria to supplement those provided to us for each system so long as we make and map these local criteria using the same five colors used for the global criteria that will be provided to each of the participating universities.

Shared Geospatial Datasets – Ryan Perkl and his colleagues at Esri will provide standard datasets for all study areas worldwide as chosen by the participating universities. These datasets are intended to provide a means for systems-based comparison (e.g., green infrastructure, agriculture, housing, etc.) but this will not limit our ability to add and use local data to address local needs or applications as the class unfolds.

Shared Presentation Protocols and Styles – A suite of common presentation standards will also be provided for our collaborations in preparatory research and scenario-based projects, again to facilitate collaboration. These may include model preparation formats (but not models), and the areal extents of projects, scales, land use colors, etc.

Class Protocols and Expectations

This is a collaborative, "hands-on" course, so you should expect this class to be both academically robust and intellectually challenging. As geodesign students, you will be expected to engage with the information you are learning and to explore the heady cauldron of ideas, opinion, and analysis that describe our collective effort to thoroughly interrogate the subject at hand. Learning arises from active engagement with the knowledge found in our work tasks and products, the accompanying reading materials, and with one another. As in any "hands-on" class, the instructor's role is that of a guide who keeps you on this path of discovery, and you will find that you will learn much from your fellow classmates and from the faculty and students participating in similar classes at 80 different universities spread around the world.

All course materials will be organized through Blackboard. The main theoretical concepts will be provided through short presentations and assigned readings, and the work tasks and accompanying deliverables will give students an opportunity to internalize and apply the concepts and theory learned from readings. Many assignments require student interaction, all will benefit from it.

The outline that follows provides the structure and rules that should be necessary to embark on this ambitious 15-week project. For a successful project, it is important that:

- Students operate as a professional team with the support and guidance of the instructors;

- All parties develop a high level of trust and spirit of collaboration;

- Students and faculty are responsive to the global project's needs while conducting independent research;

- Communication between parties is professional and frequent; and

- Students feel comfortable to make decisions, make mistakes, and learn from the experience.

Learning Objectives
When you have completed this course, you will be able to:

- Apply design concepts, planning protocols, and spatial analysis methods to a complex planning or design problem in a studio setting.

- Initiate a small-scale geodesign project by developing project plans, roles and responsibilities, timelines, and deliverables.

- Discuss the role, significance and impact of people in a studio project setting.

Prerequisite(s): None
Co-Requisite (s): None
Concurrent Enrollment: None
Recommended Preparation: SSCI 201: Principles of Geodesign

Technology Access and Support
We have several technologies that will facilitate our course work and our interactions. These will include:

Esri Ecosystem – Jack Dangermond has generously agreed to make Esri's data and relevant technology, including GeoPlanner, free for use for all participants in this global project. These include ArcGIS Pro, GeoPlanner, and CityEngine (which are all available under our Esri campus site license) plus a series of customized geospatial datasets for our study area based on ArcGIS Online and Living Atlas content.

Geodesignhub Platform – Hrishikesh Ballal makes the Geodesignhub platform free to access and use. We will need invitation codes on the platform, and these will be provided upon sign-up. Geodesignhub tutorial videos, as well as an online course (http://geodesignhub.teachable.com/p/geodesign-withgeodesignhub) will be free to students for the duration of this course as well.

SSI server and tech support – This course utilizes the SSI Server which is a virtual desktop giving access to many different professional software applications. If you are unable to connect to the server or experience any type of technical issues, send an email to SSI Tech Support at spatial_support@usc.edu and make sure to copy (cc) one or both of the instructors on the email.

Required Readings and Supplementary Materials

Textbooks – There are two books required for this course. These can be purchased from either the USC Bookstore or an online outlet such as Amazon.

- McHarg, I. L. 1969. *Design with Nature.* Garden City, NY: Doubleday/Natural History Press.
- Steinitz, C. 2012. *A Framework for Geodesign: Changing Geography by Design*. Redlands, CA: Esri Press.

These books will be supplemented with videos and a mixture of readings from academic journals, professional reports, and authoritative websites.

Videos – The following wiki and videos will help us to situate our work throughout the semester.

- Geodesign Wiki (http://www.geodesignwiki.com/)

- Geodesign Dynamics, with Seattle, WA; Hampi, India; Mulranney, Ireland; and Cache Valley, UT (2016; https://www.youtube.com/watch?v=Jf_R4rB7MIQ)

- Negotiation, with Sydney, Australia; Minas Gerais, Brazil; the Georgia Coast; and a Utah high school (2017; https://youtu.be/QERJbL9J1Xw)

- Negotiation, with Belo Horizonte favelas in Brazil (2018; https://www.dropbox.com/s/gaqrc07wc9l37i5/G79013_GeoDesignSum2018_Steinitz_v1.mp4?dl=0)

Readings – The following book chapters and journal articles will be posted to Blackboard under Course Documents:

- Hodza, P. 2014. Appreciative GIS and strength-based community change. *Transactions in GIS,* 18, 270-285.

- Poore, B. S., & Chrisman, N. R. 2006. Order from noise: Toward a social theory of geographic information. *Annals of the Association of American Geographers,* 96, 508-523.

- More to come …

Required Work Products

Your grade in this course will be determined on the basis of several different assessment tools:

Literature Review (15%) – One of the most important sections of the proposal is the background literature review. A considerable amount of the effort on the project should focus on obtaining relevant information, becoming extremely knowledgeable about the current state of knowledge related to a topic, and preparing a review of the literature as it relates to the project. The literature review should focus on peer-reviewed literature (journal articles, chapters from edited books, scholarly books) and government reports (which are often not peer-reviewed but are performed by credible scientists).

It is important that the literature review not be too narrowly focused. For example, if the group is analyzing improvements to transportation infrastructure, it will need to review literature related to that topic. In addition, if the group is going to be using scenarios as a tool for projecting future transportation needs, the literature search and review will also need to explore the use of this tool, even if the tool has never been used in transportation infrastructure studies before.

Project Proposal (20%) – Each individual or group prepares a proposal for their portion of the project based on the needs of the client (i.e., the project coordinating committee), their skills and aptitudes, and the available data. The elements of the project proposal will be: (a) Title Page; (b) Introduction; (c) Literature Review (see above); (d) Research Question(s) / Project Approach; (e) Methods; (f) Deliverables and Timeline; (g) Management Plan; and (h) Literature Cited. The project proposal is limited to 20 single-spaced pages. This limit does not include the title page and literature cited. Further details and revisions of the proposal format may be provided by the course instructors.

Proposal Presentation (5%) – At the scheduled time, each group will present their project proposal to the class. The purpose of the review is for groups to gain critical feedback regarding their project's scope, the importance of the project, and the proposed plan of work. This review process will improve the real-world nature of the problems and solutions we pursue.

The proposal presentation should be approximately 10 minutes long with time for questions afterward.

Draft / Final Reports (20% / 30%) – By the end of the fall semester, students must submit a final report of their group project. The deadline for the final report is firm. The final report provides a complete discussion of the project's goals, objectives, methodologies, and accomplishments.

Students should keep in mind that it is doubtful that they will be able to complete their reports by the end of fall semester if they do not present a high-quality draft to the instructors by the time specified. Some instructors will expect drafts earlier and may require longer periods for review and comment than others. In general, students should expect that their advisors will require at least one week, but as many as two weeks, to complete a thorough review. It is likely that more than one iteration will be necessary before the instructors find the report to be acceptable. Thus, it is critical that students and instructors discuss and agree upon a realistic timeline and have consistent expectations in terms of turn-around time. The final report should not include information restated from the Project Proposal.

The final report typically includes the following: (a) Title; (b) Abstract (not to exceed 250 words); (c) Introduction; (d) Methods; (e) Results; (f) Discussion; and (g) Literature Cited.

Final reports must be free of typographical, formatting, and other errors. More details on final report format may be provided.

The final report should reflect that the group has: (a) the ability to clearly articulate the problem orally and in writing; (b) the ability to clearly articulate the scope of the work; and (c) the ability to clearly articulate how their work is related to larger related issue(s.

Conclusions and recommendations in the report are to be based only on: (a) original interpretation and synthesis of the work of others; (b) original data and interpretations of that data; and/or (c) a combination of (a) and (b). The unsupported expression of opinion in the final report is not appropriate.

Adherence to accepted rules of citation is required. Groups should use the citation format established by the Spatial Sciences Institute for its graduate programs. Only readily retrievable sources are acceptable.

Final Presentations – The class will present their final results as part of the Geodesign lecture series at noon on Friday near the end of Fall semester. These presentations should be polished, professional, and accompanied by high quality and error-free graphics.

Peer Reviews (10%) – Each individual in the class must complete a self-evaluation and peer evaluations and submit them to the instructors by the last day of classes of the semester.

Templates for these reviews will be posted on the course website. You will be evaluated on the quality of your reviews (though your review will not impact your colleagues' grade).

Final Grading Breakdown
Careful planning and a serious, consistent commitment will be required for you to successfully navigate the various deliverables in this and other SSCI courses. The table below summarizes the SSCI 499 course assignments and their point distribution:

Assignment	Number	% of Grade
Literature review	1	15
Project proposal	1	20
Proposal presentation	1	5
Draft report	1	20
Final report	1	30
Peer reviews	1	10
TOTAL	**6**	**100**

Students will likely work in one or more groups but will be graded separately. It is not required that all students in a project receive the same grade.

At the end of the semester, students are required to complete self-evaluations and peer evaluations and submit them to their instructor by the last day of classes. The faculty will consider these evaluations in assigning grades.

Grades will not be assigned until the group has submitted and the instructor has approved the final report.

And finally, it is important to note from the outset that: (1) you are expected to attend and participate in every class session and to complete and upload all assignments before the due dates; (2) late postings and assignments will be docked one letter grade and no grade will be given for postings or assignments turned in more than one week late; and (3) no written work will be accepted for grading after 5:00 p.m. PT on the last day of classes (i.e. 30th November, 2018).

Additional Policies
Communications – This is a studio course, so many of our interactions will occur in class itself. All materials to be handed in will be submitted via the Blackboard Assessment link. I will also create one Blackboard discussion forum at the start of the semester and I may create and/or monitor additional Blackboard discussion forums through which we can discuss challenges, ideas, and issues connected with the course assignments, exercises, and projects as the need arises.

In addition, I will send via e-mail through Blackboard any notices that are time sensitive. Please be sure that you read as soon as possible all e-mail sent from Blackboard or from

me. Check now to make sure that mail sent from both USC Blackboard and our individual domains (jswift@usc.edu; jpwilson@usc.edu) does not go into your junk mail!

That said, 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, any important announcements will be posted on the Announcement page in Blackboard. Be sure to check these each time you log onto Blackboard.

Authorship/Ownership – Each member of the class, along with the instructors, is an equal owner of the data collected during the project. That means that each member of the group can use the data even after the project has ended. Papers, posters, presentations, and other derivative products that arise from the data collected during the project must acknowledge every member of the group in a manner that is appropriate to the group's contribution to the derivative product.

Data Distribution – Datasets and processed datasets that may have been obtained or derived during your work may be licensed or copyrighted or confidential. You should not make them available to third parties without authorization from your faculty advisor and the original source of data. Also, data should not be placed online unless the advisor and the owner of data have properly approved doing so.

Workload – This is a four credit, one semester course. Students should expect to spend 10 hours per week completing the work in this course.

Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	**Deliverables**
Week 1 8/20	Introduction … What is geodesign …	
Week 2 8/27	Project definitions … Assign constraints topics … Geospatial data management	Review McHarg book due Friday, 8/31
Week 3 9/4* *Monday, 9/3 is a university holiday	Client introduction … Constraints topics … Literature search … Planning context … Reference management	Constraints data maps due Friday, 9/7
Week 4 9/10	Literature reviews …. Constraints model types …	Constraints annotated Bibliography due Wednesday, 9/12 Bibliographic database due Friday, 9/14
Week 5 9/17	Discuss constraints literature reviews … Assign stakeholder advocates … Define stakeholder data topics …Stakeholder participation	Constraints literature reviews due Friday, 9/21
Week 6 9/24	Geodesign as a collaborative decision-making framework	Change variable data maps due Friday, 9/28

Week 7 10/1	Types of constraints and opportunity evaluation systems … Identified needed constraints and stakeholder models and approach …	Change variable annotated bibliography due Wednesday 10/3 Bibliographic database due Friday, 10/5
Week 8 10/8	Review constraint and opportunity models … Presentation design	First draft of constraint and opportunity models due Friday, 10/12
Week 9 11/15	Client update … Discuss constraint and opportunity models …	Second draft of constraint and opportunity models due Friday 10/19
Week 10 10/22	Evaluate against constraints and opportunities models …	Proposal Presentations
Week 11 10/29	Discuss design proposals	Peer Review of Proposal Presentations, due Wednesday, 10/31 Evaluation of constraints and opportunity models due Friday, 11/2
Week 12 11/5	Draft report discussion …	First rough draft of final report due Friday, 11/9
Week 13 11/12	Draft report discussion …	Second draft of final report due Friday, 11/16
Week 14 11/19* *Wednesday to Friday, 11/21-11/23 is a university holiday	Thanksgiving Holiday	
Week 15 11/26	Final presentations …	Final report and final peer and self-reviews due Friday 12/7

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

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

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

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center
For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086
Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support
Incidents of bias, hate crimes and micro aggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs
Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710
Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC
Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information
Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.
Provides overall safety to USC community. dps.usc.edu