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

SSCI 314, Comparative Sustainability Theory and Practice for Geodesign

Syllabus

Units: 2

Term — Day — Time: Spring 2024 -W - 9-10:50 a.m.

Location: RTH 217 (iPodia Classroom)

Instructor: Robert O. Vos, Ph.D., GISP
Office: AHF B57B
Regular Office Hours: Mondays and Fridays 9:30 a.m.-10:30 a.m. Also available by appointment via email.
Contact Info: vos@usc.edu, 213-821-1311,
or connect with me through Microsoft Teams

Library Help: Andy Rutkowski
Office: LIPA B40-A
Office Hours: Thu 10am - 12 pm or by appointment.
Contact Info: arutkows@usc.edu

IT Help: Dornsife Technology Services
Office: SHS 260
Contact Info: spatial_support@usc.edu, 213-740-2775

Course Scope and Purpose

This course introduces the comparative theory and practice of sustainability and its important role in geodesign. Sustainability is among the most pressing scientific and social challenges of our time and one of the major goals for the successful practice of geodesign. In spite of official attention from the United Nations in the late 1980's and several rounds of sustainable development goals since then, local examples of progress have not yet summed to a global equilibrium for planetary ecosystems. Global climate change, ocean degradation, deforestation, habitat loss, and species endangerment continue nearly unabated. Using sustainability theory, this course comparatively interrogates local examples to uncover what hinders efforts and discover what types of geodesign practice in which sorts of places may most rapidly bring closer the goal of a sustainable global environment.

Although much of the theory of sustainability is global, and in some sense thought to be universal, the opportunities to realize sustainability at local levels vary greatly due to divergent histories, cultures, languages, physical geographies, infrastructures, economic resources, and systems of governance. Indeed, because places can be constructed and interpreted in a myriad of ways by different people, the foregoing list is hardly exclusive of the sorts of divergences students may find when investigating specific places.

This course will largely, but not exclusively, focus on cities. In 2008, an important global threshold was reached, with over 50% of people living in cities. According to UN forecasts, by 2050 70% of the Earth's growing population will be living in urban areas. Yet, as students may find with many aspects of this course, this historic global milestone elides significant local differences in the rate, timing, and general social and physical nature of urbanization.

USC iPodia Participation

This class will be offered through USC's iPodia Program. This means that students from both USC and Vrije University (VU), Amsterdam will participate in the course using connection tools available through Microsoft Teams and USC's iPodia classroom. Vrije Universit (VU) Amsterdam hosts the Spatial Information (SPIN) laboratory which develops and applies some of the most advanced geodesign software in the world. USC and VU students will benefit from working together on class projects designed to facilitate mutual learning from familiarity with living in different urban sustainability contexts.

Learning Outcomes

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

- Describe and apply major elements of sustainability theory to diverse set of places;
- Engage with the history and socio-cultural frameworks of places different from ones they are accustomed to;

- Distinguish globally applicable theory from place-specific practice across a range of spatial contexts;
- Set and advocate for priorities for geodesign practice considering spatial contexts;
- Develop geodesign for sustainability workflows considering an international design kit and suite of practice; and
- Demonstrate an international awareness of the problems and solutions for sustainability with respect for the diversity of places, individual human rights, and the needs of other species.

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
Recommended Preparation: SSCI 201: Principles of Geodesign or SSCI 165Lgw: Sustainability Science in the City.

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)

Diversity and Inclusion – I intend that students from all backgrounds and perspectives will be well served by this course, that students' learning needs will be addressed both in and out of class, and that the diversity that students bring to this class will be viewed as a resource, strength, and benefit. I aim to present materials and activities that are respectful to everyone, and you are also expected to respect 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 yourself or for other students.

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit personal recording and distribution of any synchronous and asynchronous course content outside of the learning environment. As an iPodia course, these policies also apply to students taking this class from partner institutions.

Our classes will be recorded for iPodia and distributed only to members of the class through Microsoft Teams. Without express permission of the instructor and announcement to the class, these recordings are not allowed to be distributed outside the Microsoft Teams classroom. Distribution of recordings can inhibit free discussion, 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 purposes 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).

Course Structure

The first four weeks of the course offer an immersion in sustainability theory and its role in geodesign. At the end of this first course module, students will work with the instructor and classmates to choose a particular urban place in which to investigate and establish priorities for geodesign practice towards sustainability. Students will choose different places to study, and the aim is to include, across the students in the class, a wide variety of places at various scales around the world. Lectures will include examples from geodesign practices in cities around the world.

The second and third modules of the course will cover geodesign practice in physical and social systems of cities. A series of exercises will be provided in homework packets for the second and third modules of the course. Students will prepare the exercises before the class session in which they are indicated and will contribute to discussions based on the preparation of the exercises. The exercises will culminate in the second and third project reports at the end of the second and third modules of the course.

The course ends with a discussion of governance and scale, comparing successes and failures in regional planning and governance. The various exercises and reports will culminate in a final story map project that will be presented at the final class session and become an important part of each student's electronic portfolio.

Technological and Communication Requirements

The ArcGIS software suite is provided online via Esri's cloud and the SSI Server; hence, you do not need to install it on your own computer. Students from partner institutions will have access via USC's resources. Every student must have the following technology requirements:

- A computer with a fast Internet connection.
- A functional webcam and a microphone
- An up-to-date web browser to access the 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/

Microsoft Teams – This course will utilize the learning management system inherent in Microsoft Teams, allowing students to access course content, upload assignments, and participate in discussion forms, among other learning experiences. Students will receive a Microsoft Teams account and/or a link to our course from the iPodia program. USC students will use their existing email to login directly. For students from partner schools, USC iPodia will add their email to MS Teams. They will then finish the registration process through their own account or through their home institution.

SSI Server and Tech Support – This course utilizes the SSI Server which is a virtual desktop giving access to many different professional software packages. 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 Microsoft Teams. 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 in Microsoft Teams.

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 announce this via Microsoft Teams.

Required Readings and Supplementary Materials

All of the supplementary readings listed below are available online through USC Libraries or under the tab marked “Readings” on the course Blackboard.

Required Textbook:

- Brunn, S.D., J.K. Graybill, M. Hays-Mitchell, and D. Zeigler (Eds). 2020. *Cities of the World: Regional Patterns and Urban Environments*, 7th Edition. New York: Rowman and Littlefield (ISBN: 978-1538126349) (Available at the USC Bookstore).

Supplemental readings will available in Microsoft Tams and will be drawn from various sources, including:

- Angel, S. 2011. *Making room for a planet of cities*. Policy Focus Report (PF027). Cambridge, MA: Lincoln Institute of Land Policy.
- Dur, F., T. Yigitcanlar, and J. Bunker. 2014. A spatial-indexing model for measuring neighbourhood-level land-use and transport integration. *Environment and Planning B: Urban Analytics and City Science* 41(5), 792-812.
- Hettinga, S., P. Nijkamp, and H. Scholten. 2018. A multi-stakeholder decision support system for local neighborhood energy planning. *Energy Policy*, 277-288.
- Huang, L., W. Xiang, J. Wu, C. Traxler, and J. Huang. 2019. Integrating GeoDesign with Landscape Sustainability Science. *Sustainability* 11, 833.
- Hutton, G. and C. Chase. 2016. The knowledge base for achieving the sustainable development goal targets on water supply, sanitation and hygiene. *International Journal of Environmental Research and Public Health* 13, 536.
- Meenar, M.R. 2019. Integrating placemaking concepts into green stormwater infrastructure design in the City of Philadelphia. Environmental Practice 21(1), 4-19.
- Monteiro, L.D.O., A.C.M. Moura, C.M. Zyngier, I.S. de Sena, and P.L. de Paula. 2018. Geodesign facing the urgency of reducing poverty: The cases of Belo Horizonte. *Disegnarecon* 11(20), 6.1-6.14.
- Neuman, M. and W. Zonneveld. 2018. The resurgence of regional design. *European Planning Studies* 26(7), 1297-1311.
- Nyerges, T., H. Ballal, C. Steinitz, T. Canfield, M. Roderick, J. Ritzman, and W. Thanatemaneerat. 2016. Geodesign dynamics for sustainable urban watershed development. *Sustainable Cities and Society* 25(August), 13-24.
- Purvis, B., Y. Mao, and D. Robinson. 2019. Three pillars of sustainability: in search of conceptual origins. *Sustainability Science* 14, 681-695.
- Ross, C. (Ed.). 2009. Megaregions: planning for global competitiveness. Washington, D.C.: Island Press.
- Ruddell, D., A. Brazel, W. Chow, and A. Middel. 2020. The urban heat island effect and sustainability science: Causes, impacts, and solutions. In B. Hagen and K.D. Pijawka (Eds.), *Sustainability for the 21st Century: Pathways, Programs, and Policies*, 3rd Edition (pp. 281-301). Dubuque, IA: Kendall Hunt.
- Soltani, A. and E. Sharifi. 2012. A case study of sustainable urban planning principles in Curitiba (Brazil) and their applicability in Shiraz (Iran). *International Journal of Development and Sustainability* 1(2), 120-134.
- Thomas, R., D. Pojani, S. Lenferink, L. Bertolini, D. Stead, and E. van der Krabben. 2018. Is transit-oriented development (TOD) an internationally transferable policy concept? *Regional Studies* 52(9), 1201-1213.

- Webster, D., F. Zhang, and J. Cai. 2017. China's pursuit: smart sustainable urban environments. In B. Hagen and K.D. Pijawka (Eds.), *Sustainability for the 21st Century: Pathways, Programs, and Policies*, 2nd Edition (pp. 307-331). Dubuque, IA: Kendall Hunt.
- Wu, C. and Y. Chiang. 2018. A gedeodesign framework procedure for developing flood resilient city. *Habitat International* 75(May), 78-89.
- Yang, P.P., S.J. Quan. D. Castro-Lacoture, and B.J. Stuart. Geodesign method for managing a close-loop urban system through algae cultivation. *Applied Energy* 231(December), 1372-1382.

Description and Assessment of Assignments

For this two-unit course, students will participate in 30 hours in the classroom and can expect 60 hours of outside class work over the course of the semester.

This course includes a diversity of assessments that allow students to show 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.

Assigned Presentation on World Cities – 1 worth a total of 7 points. Students will make presentations on the sustainability challenges of cities outside the United States and Europe.

Exercises and Short Plan – 3 worth a total of 24 points. A set of 3 exercises is included in Modules 2 and 3. The "hands-on" tasks that comprise these exercises will introduce the tools of scientific inquiry and give students practical experience in implementing spatial tools within geodesign practice. All students must complete the first of these on urban footprints. For the second and third of these, students may choose among the topics covered in Modules 2 and 3, and students will provide the instructor with a short plan worth 1 point indicating their choices and as a basis for discussion before commencing this work.

Projects *– 2 worth a total of 20 points*. Two projects are spread across the course. The first project relates to initial research on and establishing the urban place that the student will work on during the exercises in the course. The second compiles and frames the work to be done for the final story map project as a written proposal.

Final Story Map Project – 1 worth a total of 25 points. The final project will set priorities and identify methods for geodesign practice in the urban place that a student has studied throughout the semester. The story map format will allow for students to use data visualizations to put forward a compelling case for geodesign work towards sustainability in a specific place. The story maps will be a basis for lively discussion at the final class session and will be a valuable part of the student's electronic portfolio.

Class Participation– 1 worth a total of 3 points. This class is taught in a seminar style and class participation is both expected and assessed. Class participation includes assigned short presentations on sustainability issues, raising questions and issues for clarification during

lectures, and engagement in discussions led by the instructor or guest lecturers. Students who stay current with the reading will be best positioned to participate. Assessment of participation will be based on feedback on assigned short presentations and attendance records.

Final Exam – 1 worth a total of 20 points. The final exam is a closed book written exam . This exam will cover content learned during lecture as well as in the course readings.

Grading Breakdown

The table below shows the breakdown of the assessments and their weight in the final grade. The emphasis is on regularly completing a several projects as well as solid performance on the final examination.

Assessment	Number	Points Each	Total Points (% of Grade)
World Cities Presentation	1	7	7
Projects	2	10	20
Exercises	3	8	24
Exercises Short Plan	1	1	1
Final Story Map Project	1	25	25
Final Exam	1	20	20
Class Participation	1	3	3
Totals	9	--	100

Grading Scale

Assignments in this and other SSCI courses, are graded on a percentage of the total points available for a given assignment. The grading scaled corresponds to letter grades where A is exemplary, B is very good, C is satisfactory, D is unsatisfactory, and F needs improvement. Final letter grades are assigned according to the total points earned in the course using standard rounding rules. 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

Assignments must be submitted via Microsoft Teams by the due dates specified in the Course Schedule. Attention to on-time assignment submission is essential because you will want instructor feedback in time to take it into account on future assignments.

Strict penalties apply for late assignments as follows:

- Assignments will be penalized 20% per day for up to five days late. No points will be given for submissions more than five days late.
- Additionally, no written work will be accepted for grading after 5 p.m. PT on the last day of classes.

Schedule

Date	Topics	Readings	Deliverables/Due Dates
Module 1 | Introduction to Sustainability Theory in Geodesign			
Week 1			
1/10	Introduction: Defining Sustainability	Vos (2007) Brunn et al. (2016) Chapter 1 Soltani and Sharifi (2012)	
Week 2*			
1/17	Operationalizing Sustainability in Geodesign	Huang et al. (2019) Brunn et al. (2016) Chapter 13 Purvis et al. (2019) (Recommended)	
Week 3			
1/24	Trends and Historical Overviews	Brunn et al. (2016) *Historical Perspectives* in Chapters 2-12 (individual chapters as assigned)	Presentation on World Cities (1/24)
Week 4			
1/31	Comparative Contexts of Practice	Webster et al. (2017) Brunn et al. (2016) (individual chapters to be assigned)	First Project Report (2/6)
Module 2 | Comparison of Physical Systems in Cities			
Week 5			

2/7	Landscapes: Urban Form and Urban Footprint	Angel (2011) & Also view: http://www.atlasofurbanexpansion.org	Urban Footprint Exercise (Required) (2/13) Exercises Short Plan (Required) (2/13)
Week 6			
2/14	The "Brown" Agenda: WaSH and Air Quality	Hutton and Chase (2016)	Environmental Health Exercise (Optional) (2/20)
Week 7			
2/21	Urban Climate: Heat Islands and Resilience to Climate Change		Urban Climate Exercise (Optional) (2/27)
Week 8			
2/28	Water: Rivers and Coastal Zones	Nyerges et al. (2016)	River or Port Exercise (Optional) (3/5)
Week 9			
3/6	Biophilic Cities and Geodesign for Ecological Security		Biophilic Cities Exercise (Optional) (3/19)
Spring Break 3/12-3/19			
Module 3 | Comparison of Social Systems in Cities			
Week 10			
3/20	Placemaking: Culture and the Built Environment	Meenar (2019)	Place-Making Exercise (Optional) (3/26)
Week 11			
3/27	Transportation Systems: Goods Movement and Transit	Thomas et al. (2018) Dur et al. (2014)	Transportation Systems Exercise (Optional) (4/2)
Week 12			

4/3	Industrial Systems: Hard and Soft Infrastructures of Energy	Hettinga (2018) Yang (2018) (Recommended)	Housing Exercise (Optional) (4/9) Second Report Due (4/9)
Week 13			
4/10	Housing: Quality, Affordability, and Mapping	Monteiro et al. (2018)	Energy Exercise (Optional) (4/16)
Module 4 | Governance and Scale			
Week 14			
4/17	New Regionalism in Comparative Perspective and the Rise of Megaregions	Neumann and Zonneveld (2018) Ross (2016)	
Week 15			
4/24	Concluding Thoughts: How does variation in places inform sustainability theory?	Story Map Project Presentations	Final Story Map Project Due (4/24)
Final Exam TBD/TBA According to USC's Final Exam Schedule			

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.