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

SSCI 499, Comparative Sustainability Theory and Practice for Geodesign

Syllabus

Units: 2

Term Day Time: Spring 2021 – Thursdays – 9-10:50 a.m.

Location: Online

Instructor: Robert O. Vos, Ph.D., GISP
Office: AHF B57B
Regular Office Hours: Mondays and Wednesdays 10 a.m.-11 a.m. Also available by appointment via email.
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IT Help: Richard Tsung
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Office Hours: By appointment
Contact Info: ctsung@usc.edu, 213-821-4415 (office)

Course Description

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.

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, each student will work with the instructor and classmates to choose a particular urban place in which to investigate and establish priorities for sustainable geodesign practice. Each student will choose a different place 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. For lectures throughout the course, the instructor will include examples from cities in the United States, but students will investigate urban places outside the United States.

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 module 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 at 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.

This course provides the opportunity to meet and work with faculty, students and practitioners from the Netherlands multiple times throughout the semester. This will expose students to more perspectives on urban places around the world and the evolving scope and methods of geodesign practice for sustainable cities.

Learning Objectives

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

- Describe and apply major elements of sustainability theory to urban 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;
- Set and advocate for priorities for geodesign practice;
- Evaluate and choose among geodesign methods in response to priorities for sustainability practice in geodesign; 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.

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

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

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

Textbook:

- Brunn, S.D., J.K. Graybill, M. Hays-Mitchell, and D. Zeigler (Eds). 2015. *Cities of the World: Regional Patterns and Urban Environments*, 6th Edition. New York: Rowman and Littlefield.

Supplemental materials:

- Allsopp, L. 2020. Urban sustainable design. In B. Hagen and K.D. Pijawka (Eds.), *Sustainability for the 21st Century: Pathways, Programs, and Policies*, 3rd Edition (pp. 77-99). Dubuque, IA: Kendall Hunt.
- Angel, S. 2011. *Making room for a planet of cities*. Policy Focus Report (PF027). Cambridge, MA: Lincoln Institute of Land Policy.
- Beatley, T. 2020. A global shift to biophilic cities: The vision and emerging practice for the future. In B. Hagen and K.D. Pijawka (Eds.), *Sustainability for the 21st Century: Pathways, Programs, and Policies*, 3rd Edition (pp. 303-328). Dubuque, IA: Kendall Hunt.
- Bettencourt, L.M.A., J. Lobo, D. Helbing, C. Kühnert, and G.B. West. 2007. Growth, innovation, scaling and the pace of life in cities. Proceedings of the National Academy of Sciences 104(17), 7301-7306.
- Boeing, G. 2018. Planarity and street network representation in urban form analysis. *Environment and Planning B: Urban Analytics and City Science* published online before print. doi:10.1177/2399808318802941
- d'Amour, C.B., F. Reitsma, G. Baiocchi, S. Barthel, B. Guneralp, K. H. Erb, H. Haberl, F. Creutzi, K.C. Seto. 2017. Future urban land expansion and implications for global croplands. Proceedings of the National Academy of Sciences 114(34), 8939-8944.
- Dur, F., T. Yigitcanlar, 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.
- Gugler, J. (Ed.). 2004. *World cities beyond the West: Globalization, development, and inequality*. New York, NY: Cambridge University Press.
- Hagen, B., A. Middel. 2020. What Should Sustainable Cities Look Like? Programs, Policies, and Initiatives. In B. Hagen and K.D. Pijawka (Eds.), *Sustainability for the 21st Century: Pathways, Programs, and Policies*, 3rd Edition (pp. 53-75). Dubuque, IA: Kendall Hunt.
- Huang, L., W. Xiang, J. Wu, C. Traxler, J. Huang. 2019. Integrating GeoDesign with Landscape Sustainability Science. *Sustainability* 11, 833.
- Hutton, G., 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, 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. 2000. Regional design: Recovering a great landscape architecture and urban planning tradition. *Landscape and Urban Planning* 47, 115-128.
- 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.
- Perry, P.Y., S.J. Quan. D. Castro-Lacoture, B.J. Stuart. Geodesign method for managing a close-loop urban system through algae cultivation. *Applied Energy* 231(December), 1372-1382.
- Purvis, B., Y. Mao, 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.
- Seto, K. C., B. Güneralp, L.R. Hutyra. 2012. Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proceedings of the National Academy of Sciences* 109(40), 16083-16088.
- Soltani, A., 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.
- Temmerman,S., P. Meire, T.J. Bouma, P.M.J. Herman, T. Ysebaert, H.J. De Vriend. 2013. Ecosystem-based coastal defence in the face of global change. *Nature* 504(5), 79-83.
- Thomas, R., D. Pojani, S. Lenferink, L. Bertolini, D. Stead, E. van der Krabben. 2018. Is transit-oriented development (TOD) an internationally transferable policy concept? *Regional Studies* 52(9), 1201-1213.
- Vos, Robert O. 2007. Defining Sustainability: A Conceptual Orientation." *Journal of Chemical Technology and Biotechnology* 82, 334-339.
- Webster, D., F. Zhang, 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., Y. Chiang. 2018. A gedeodesign framework procedure for developing flood resilient city. *Habitat International* 75(May), 78-89.
- World Health Organization (WHO). 2016. *Ambient air pollution: A global assessment of exposure and burden of disease.* Geneva, Switzerland: World Health Organization.

Description and Valuation of Assessments

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.

Exercises

A set of seven exercises is included in Modules 2 and 3 of the course. The "hands-on" tasks that comprise these exercises will introduce the tools of scientific inquiry and give students practical experience in implementing these tools within geodesign practice. The exercises are different from the lecture content but will be an important basis for class discussion at each class meeting during Modules 2 and 3 of the course.

Projects

A set of three projects is 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 and third projects compile and frame the work done for the exercises in a written submission to the instructor.

Final Story Map Project

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.

Final Exam and Other Policies

The final exam is closed book. This exam will cover content learned during lecture as well as in the course readings.

No make-up opportunities will be offered for the final exam, so mark the appropriate date on your calendar! If you have a legitimate conflict, per the USC policy on Final Exam Scheduling, speak with me as soon as possible. In addition, please note that there is **no credit for late assignments.**

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 number of projects as well as solid performance on the final examination.

Assessment	Number	Points Each	Total Points (% of Grade)
Projects	3	10	30
Exercises	7	5	35
Final Story Map Project	1	15	15
Final Exam	1	20	20
Totals	6	--	100

Schedule

Date	Topics	Readings	Deliverables/Due Dates
Module 1 | Introduction to Sustainability Theory in Geodesign			
Week 1			
1/21	Introduction: Defining Sustainability	Vos (2007) Brunn et al. (2016) Chapter 1 Hagen and Middel (2020) Soltani and Sharifi (2012)	
Week 2*			
1/28	Operationalizing Sustainability in Geodesign	Purvis et al. (2019) Allsopp (2020) Huang et al. (2019) Brunn et al. (2016) Chapter 13	
Week 3			
2/4	Trends and Historical Overviews	Bettencourt et al. (2007) Brunn et al. (2016) *Historical Perspectives* in Chapters 2-12	

Week 4			
2/11	Comparative Contexts of Practice	Webster et al. (2017) Gugler (2004) (individual chapter assignments TBD/TBA) Brunn et al. (2016) (individual chapter assignments TBD/TBA)	First Project Report
Module 2 | Comparison of Physical Systems in Cities			
Week 5			
2/18	Landscapes: Urban Form and Urban Footprint	Angel (2011) & Also view: http://www.atlasofurbanexpansion.org Seto et al.(2012) d'Amour et al. (2017) Boeing (2018)	Urban Footprint Exercise
Week 6			
2/25	The "Brown" Agenda: Air Quality, WaSH, and Solid Waste	Hutton and Chase (2016) World Health Organization (2016)	Environmental Health Exercise
Week 7			
3/4	Urban Climate: Heat Islands and Resilience to Climate Change	Ruddell et al. (2020) Temmerman et al. (2013) Wu and Chiang (2018)	Urban Climate Exercise
Week 8			
3/11	Water: Rivers and Coastal Zones	Nyerges et al. (2016)	River or Port Exercise
Week 9			
3/18	Biophilic Cities	Beatley (2020)	Biophilic Cities Exercise

Module 3 | Comparison of Social Systems in Cities			
Week 10			
3/25	Placemaking: Culture and the Built Environment	Brunn et al. (2016) (individual chapter assignments TBD/TBA) Meenar (2019)	Second Project Report Due
Week 11			
4/1	Transportation Systems: Goods Movement and Transit	Thomas et al. (2018) Dur et al. (2014)	Transportation Systems Exercise
Week 12			
4/8	Housing: Quality, Affordability, and Mapping	Monteiro et al. (2018)	Housing Exercise
Week 13			
4/15	Industrial Systems: Hard and Soft Infrastructures of Energy	Perry (2018)	Third Project Report
Module 4 | Governance and Scale			
Week 14			
4/22	New Regionalism in Comparative Perspective and the Rise of Megaregions	Neuman (2000) Neumann and Zonneveld (2018) Ross (2009) (individual chapter assignments TDD/TBA)	
Week 15			
4/29	Concluding Thoughts: How does variation in places inform sustainability theory?	Story Map Project Presentations	Final Story Map Project Due
Final Examination (Date and Time TBD; Location TBD; Closed Book)			

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.