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

SSCI 165Lgw |
Sustainability Science in the City

Units: 4

Term-Day-Time: Fall 2016 – MWF – 10:00-10:50 a.m.

Location: THH 202

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Course Description

Sustainability is among the most pressing scientific and social challenges of our time. Typically defined as utilizing natural resources so as to create a high quality of life for *future* as well as current generations, the idea of sustainability has provided a strong orientation towards a long-term re-thinking of the human role in and domination of ecosystems. Yet, despite the emergence of a sustainability policy discourse in the late 1980s, global climate change, ocean degradation, deforestation, habitat loss, and species endangerment continue nearly unabated. This situation seriously threatens the inventory of natural capital for present and future generations.

In response to such ongoing challenges, the field of *sustainability science* emerged in the late 1990s. It is a multidisciplinary collection of social, physical, and life sciences working to understand the complex coupling of human and natural systems across global, national, regional, and local scales. Without a deep understanding and reconsideration of the human role in natural systems, it is impossible to envision a sustainable future. Thus, policymakers rely upon various forms of scientific knowledge and the scientific method itself to understand how to re-chart the human journey towards sustainability.

This course is a Social Analysis (Category C) **and** a Citizenship in a Global Era (Category G) course in the Fall 2015 General Education program. In this course, you will learn how social and ethical theories of sustainability relate to the emergence of sustainability science and how theory and empirical work are mutually constitutive. In particular, you will learn why the social and natural sciences and their methods are important to policies and planning for sustainable cities.

This course is also a Category VI (Social Issues) course in the pre-Fall 2015 General Education program. In this course, you will learn how to analyze issues of climate change, resource management, and sustainability using data from the social and natural sciences to assess the validity of arguments about reshaping cities for sustainability. You will also critically evaluate and make use of media, Internet, and traditional academic sources to develop your own digital "Story Maps" on a key issue urban sustainability for one city.

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. The rapid growth of cities across the world results from a common undercurrent of global political and economic forces that rests on a history of colonialism. An understanding of these forces and how they might be reshaped to create sustainable forms of urban development will be key to our enquiry. Indeed, issues of global sustainability are increasingly *urban* issues: land use, population, consumption, industrial organization, and infrastructural technologies (e.g. energy).

In a series of laboratory experiences and linked writing exercises, you will learn how to articulate the relationships among observed phenomena, the analytical approaches and methods used to understand them, and their societal implications. For example, one focus of sustainability science is improving our understanding of how the Earth's land cover and land use is changing as a result the growth of cities, and what it means for people and places. In the laboratory, you will learn how technological tools and data, such as geographic information systems and satellite imagery, are used for measuring land use/land cover change and how observed land use/land cover changes are linked to principles of urban form and urban economics. In a related writing assignment, you will consider how land use/land cover influences social well-being, economic livelihoods, and land use politics and regulation.

Learning Objectives

The central learning objective of this course is to enable students to understand how applications of particular scientific methods influence are influenced by debates over urban sustainability.

Through a series of field and computer lab exercises, students will learn about data collection, non-experimental research design, computational modeling, and scientific validity. Students will learn how sustainability scientists measure and classify both natural and social systems in cities, and how they understand the complex interweaving of these systems with people and technologies. Through hands-on learning in the laboratory and engagement with the sustainability science literature, students will learn how science and analysis methods are connected to real-world challenges of urban sustainability.

Through a final course project called a "story map," students will perform analysis using GIS tools and also learn about the challenges of and methods for synthesizing and communicating science with the public and policymakers. In our digital world, understanding and producing visual communication is just as important to informed citizenship as writing. The use of these tools is complemented by focused writing assignments in which students reflect on policy implications of laboratory experiences. In this course, students will learn basic cartographic principles and how to integrate maps with sensor data and digital resources to attractively communicate underlying science and policy. By the end of the course, students will be able to evaluate scientific claims and discuss alternative pathways toward sustainable cities with enriched understanding of the scientific context of knowledge and communication skills.

Required Reading and Supplementary Materials

Please acquire the texts listed below, all are available at the USC bookstore. **All other reading** listed in the syllabus is available under the tab marked **"Readings" on the course Blackboard**.

Pljawka, K.D. 2015. Sustainability for the 21st Century: Pathways, Programs, and Policies. Dubuque, IA: Kendall Hunt.

Smith, D.A. 2000. Third World Cities (Second Edition). New York: Routledge (*Note:* Ebrary book at USC library, available free to students)

Wheeler, S. 2013. Planning for Sustainability: Creating Livable, Equitable, and Ecological Communities (2nd Edition*).* New York: Routledge

Description and Assessment of Assignments

Students must attend all regularly scheduled lectures/in-class exercises, participate in labs, write responses in online discussions, write article summaries, sit for mid-term and final examinations, and produce a final project called a "story map." **Absences from lab sessions** must be requested by sending an email to the laboratory co-instructor for your lab section. Excused absences from labs will be granted only for valid reasons; please notify us of the reason for your absence in your email.

Fieldtrips

At a *minimum*, students are **encouraged to attend at least one of the scheduled fieldtrips**. Attending one filed trip will result in 2 extra credit points in the course. Pending available space, students are encouraged to attend as many of the fieldtrips as possible, though no additional extra credit will be awarded.

Story Maps

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 in Geographic Information Systems (GIS).

Story maps are increasingly in use in sustainability science and are an important tool to describe the challenges of sustainable cities and pathways toward sustainability. 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 integrates data on social and natural systems around one of our course's learning modules. Additional information on each

learning module and the potential for final projects is on the course Blackboard site. Your story map will integrate scientific data like the examples above but will be focused at local scales. An example of this sort of integration is a map of green infrastructure created for the City of Nashville (see, http://maps.nashville.gov/LID%5FSites/). For an example of a river revitalization map see: http://ugis.esri.com/LA_River_Tour/#map. Please note, however, that this particular story map, like some examples of story maps you may see on the web, is simply a montage of geotagged photographs. Your map will be much more than this. It may have 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 other examples linked above, to communicate underlying analysis.

Labs

In addition to the lectures and in-class exercises, there is a set of 12 labs across the semester. These laboratory experiences are designed to introduce you to the tools of spatial and social analysis as well as to give you practical experience in implementing these tools to explore various problems within the framework of the scientific method. These assignments are linked to the lectures and class discussions, but do not duplicate the lecture experience. You must register for one laboratory session in addition to registering for the lectures. Your laboratory assignments will be completed during the 2-hour lab sessions and shortly after will be graded and returned

Online Discussions

There will also be four online discussions on Blackboard (Bb). The purpose of the on-line discussions is to build skills for close reading and critical thinking using articles on social theory and peer-reviewed scientific articles taken from the sustainability science literature. The discussion forums function on Bb is quite useful in this regard. In each discussion, every student will make one short post responding to the instructor's prompt(s) and then make at least two posts responding to other students or further prompts from the instructor and/or co-instructors. Your participation in the online discussions will be *individually graded* using the gradebook feature on Bb.

Article Summaries

Throughout the semester, students will also produce 4 summaries of articles from major press outlets (e.g., Atlantic Cities, Wall Street Journal, New York Times, and Los Angeles Times) on issues of sustainable cities. Students should use these short writing assignments strategically to explore existing interests and build background knowledge for the story map project.

Other Assignments and Assessments

There will be one policy essay researched and written in response to a prompt from the instructor. The mid-term and final exams will include content learned in the field trips, course readings, lectures, laboratory sessions, in-class exercises, and online discussions

sessions. **No make-up opportunities will be offered for missed exams or labs,** 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 weight in the final grade. The emphasis is on regularly completing a number of short assignments as well as solid performance on examinations and the final project. Assignments must be submitted as noted, typically on the appropriate Blackboard (Bb) site.

Assignments	**Number**	**Total Points (% of Grade)**
Online Discussions (Complete on Lecture Section Bb)	4	12
Laboratory Reports *Note: Lab reports are not included in the list of deliverables/due dates on the course schedule. Submit all Lab Reports via Bb for your laboratory section at the conclusion of each lab session.*	12	24
Article Summaries (Submit on Lecture Bb)	4	12
Policy Essay (Submit in class & on Lecture Bb)	1	12
Midterm Exam (In class closed book)	1	12
Final Exam (Closed book)	1	14
Final Project: Story Map (Submit URL to Lab Section Bb) and give oral report	1	14
Totals	**24**	**100**

Course Schedule

The course will be organized around the following 8 modules with accompanying lectures, on-line discussions, in-class exercises, readings, laboratory experiences, and writing assignments:

Date	Topics	Readings	Deliverables/Due Dates
Module 1| Theories and Key Concepts			
Week 1			
8/22	Introduction to the Course		
8/24	The Urban Sustainability Problematic	Pijawka Ch. 1 Wheeler Ch. 1 & 4	
8/26	Competing Definitions of Sustainability and Sustainable Cities	Pijawka Ch. 3 & 4 Wheeler Ch. 2 Vos, R. O. 2007. "Defining sustainability: a conceptual orientation." *Perspective in Journal of Chemical Technology and Biotechnology* 82: 334-339.	
Week 2			
8/29	The Global Context of Sustainable Cities	Drakakis-Smith pp. 1-10 Pijawka Ch. 2, 5, & 17 Wheeler Ch. 19	
8/31	Is Population Growth the Key?	Drakakis-Smith Ch. 1 & 3 Wheeler Ch. 17	
9/2	Sustainable Cities or Resilient Cities?	Pijawka Ch. 6	Online Discussion 1 Due, 11:59 p.m.
Module 2| Urban Land Development and Politics			
Week 3			
9/5	Labor Day (No Class)		
9/7	Challenges of Governing for Sustainability	Wheeler Ch. 20, 21, & 23	
9/9	Possibilities of Governing for Urban Sustainability	Wheeler Ch. 18	

Module 3| Urban Footprints: Resource Exploitation & Consumption			
Week 4			
9/12	The Urban Footprint	Drakakis-Smith Ch. 4	Article Summary 1, Due 11:59 p.m.
9/14	The Urban *Ecological* Footprint		
9/16	Life Cycle Thinking	Pijawka pp. Ch. 8	
Week 5			
9/19	The Problem of Consumption	Princen, T. 2002. "Consumption and its Externalities: Where Economy Meets Ecology pp. 23-42 in T. Princen, M. Maniates, and K. Conca (eds.) *Confronting Consumption*. Cambridge, MA: MIT Press	
9/21	Distancing of Waste in a Global Economy	Drakakis-Smith Ch. 5	
9/23	Consumption in the Urban Landscape	Wheeler Ch. 11	
Module 4 | Reclaiming Urban Nature			
Week 6			
9/26	Individual Versus Collective Responses to Consumption	Goldstein, N.J. and Cialdini, R.B. 2008. "A Room with a Viewpoint: Using Social Norms to Motivate Conservation in Hotels." *Journal of Consumer Research* 35: 472-482. Maniates, M. 2002. "Individualization: Plant a Tree, Buy a Bike, Save the World?" pp. 43-66 in T. Princen, M. Maniates, and K. Conca (eds.) *Confronting Consumption*. Cambridge, MA: MIT Press.	Article Summary 2, Due 11:59 p.m. Field Trip Sign-up Due, 11:59 p.m.

9/28	The Nature of the City	Wheeler Ch. 9 Wheeler pp. 312-322 Cronon, W. 1996. "The Trouble with Wilderness: Or, Getting Back to the Wrong Nature." *Environmental History* 1(1): 7-28.	
9/30	Water Resources in Cities	Pijawka Ch. 10 Pijawka pp. 166-169 Wolch et al. 2014. "Urban Greenspace, Public Health, and Environmental Justice: The Challenge of Making Cities 'Just Green Enough'" *Landscape and Urban Planning* 125: 234-244.	Online Discussion 2 Due, 11:59 p.m. Article Summary 3, Due 11:59 p.m.
Week 7			
10/3	Restoring Urban Biodiversity	Pijawka Ch. 7	Article Summary 4, Due 11:59 p.m.
10/5	Mitigating GHG Emissions in Cities	Wheeler Ch. 7	
10/7	Fieldtrip to the LA River (*No regular class meeting*)		Online Discussion 3 Due, 11:59 p.m.
Module 5| Climate Change: Mitigation and Adaptation			
Week 8			
10/10	Climate Change: ESEM and Agenda Setting		
10/12	Adapting to Climate Change in Cities	Pijawka Ch. 13 Pijawka pp. 159-166	
10/14	Midterm Review		

Module 6| Environmental Justice (EJ): Community-based Sustainability Science			
Week 9			
10/17	Midterm Exam		
10/19	Special Issue: Sustainable Transportation & Smart Growth	Pijawka Ch. 11 Wheeler Ch. 10 & 12 Wheeler pp. 291-312	
10/21	History and EJ in the City	Drakakis-Smith Ch. 2 Wheeler pp. 203-204	
Week 10			
10/24	Social and Spatial Analysis of Environmental "Bads"	Pulido, L., S. Sidawi, and R. O. Vos 1996. "An Archeology of Environmental Racism in Los Angeles," *Urban Geography* 17: 419-439.	
10/26	Social and Spatial Analysis of Environmental Goods		
10/28	Special Issue: Ports of Los Angeles and Long Beach		Online Discussion 4 Due, 11:59 p.m.
Module 7| Greening the Urban Economy and Urban Metabolism			
Week 11			
10/31	Fieldwork (*No regular class meeting*)		
11/2	Industrial Ecology: The Science & Technology of Sustainability	Wheeler Ch. 8	
11/4	Urban Metabolism Concept and Models	Wheeler Ch. 14	
Week 12			
11/7	The Role of Green Buildings in Urban Metabolism	Pijawka Ch. 8 (Review) Wheeler Ch. 13	
11/9	The New Regionalism	Wheeler pp. 198-202 Wheeler Ch. 22	
11/11	Green Jobs	Wheeler Ch. 16	

Week 13			
11/14	Special Issue: Eco-Industrial Parks		Policy Essay Due at Class (Hard Copy) and Submit to Bb by the start of class.
11/16	Sustainable Livelihoods in Developing World Cities	Drakakis-Smith Ch. 5 & 6	
11/18	Field Trip to Port of Los Angeles (*No regular class meeting*)		
Module 8| Indicators, Tools, and Sustainable Citizenship			
Week 14			
11/21	Sustainability Indicators: Measurement & Reporting	Pijawka Ch. 14 Wheeler Ch. 6	
11/23	Thanksgiving (No Class)		
11/25	Thanksgiving (No Class)		
Week 15			
11/28	Urban Models: How Can Geodesign Contribute?	Pijawka Ch. 15	
11/30	Sustainable Citizenship	Bullen, A. and Whitehead, M. 2005. "Negotiating the Networks of Space, Time and Substance: A Geographical Perspective on the Sustainable Citizen." *Citizenship Studies* 9: 499-516.	
12/2	Final Exam Review		
12/12	**Final Examination 11 a.m.-1 p.m. (Closed Book)**		

Laboratory Topics and Learning Objectives

Week 1 No Lab (Introductory Week)
Week 2 Population Modeling for Manhattan, NY
Week 3 No Lab (Labor Day)
Week 4 Mapping the Urban Footprint of Raleigh, NC
Week 5 Mapping Billboards
Week 6 Modeling Urban Forests Versus Income
Week 7 Story Map Introduction, Team Selection, and Proposal Development
Week 8 Story Map Skills Session
Week 9 Indexing Neighborhood Walkability
Week 10 Mapping Air Toxics in Los Angeles
Week 11 Story Map Working Session
Week 12 Story Map Working Session
Week 13 Story Map Working Session
Week 14 No Lab (Thanksgiving)
Week 15 Story Map Final Presentations

Laboratory Protocol

Each of the 2-hour lab sessions will start on the hour with a brief introduction. These introductions will take about 10-20 minutes. Therefore, **students arriving more than 10 minutes after the scheduled start times for laboratory sessions will be turned away and assigned a zero grade for that particular lab assignment**. No lab reports will be accepted for grading if handed in outside of the regularly scheduled lab session. One or the other of two different kinds of tasks will be completed during the lab sessions, as explained below.

First, for the lab sessions linked to the course lecture content (see titles above), you will work on self-guided work tasks using specialized geographic analysis tools and one or more geospatial datasets or computer modeling tools. These tasks should take approximately 75 minutes to complete. After this time, the instructor will convene a 15 minute roundtable discussion of what you have done, what it means, how it relates to key concepts of sustainable cities covered in the readings and lectures, and how these tasks might have been varied and/or enhanced if performed by professionals in a real-world setting. The final 15 minutes of this series of lab sessions will be available for each of you to prepare and submit your final lab report for grading. Second, in other weeks you will engage in a series of tasks during the lab sessions that will build skills and allow in class work time needed for the story map projects. As with all labs, you will prepare short reports at the end of each lab session demonstrating that you have mastered the particular methods and lab skills being taught at each session.

The sequence of labs ends with 3 labs called “Story Map Working Session” towards the end of the course. In these lab sessions, you will work with teams of classmates and with your laboratory co-instructor to make use of the datasets and geospatial software

available in the lab to complete components of your story map. This will include connecting with and analyzing custom data and making maps. Some elements of the story map may be completed on your personal computers or using USC's general computer labs on your own time. But most of the story map will be created in the lab sessions where you have access to geospatial software and support from your laboratory co-instructor, and generally there should be enough time scheduled in labs to complete your story maps without using time outside of class.

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://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions. 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 Center for Women and Men* http://www.usc.edu/student-affairs/cwm/ 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.