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

SSCI 301L, Maps and Spatial Reasoning

Syllabus

Units: 4

Term — Day — Time: Spring 2018, Mondays and Wednesdays, 2:00 to 3:20 p.m.

Location: WPH 102 (lectures), AHF 145A (labs)

Instructor: Elisabeth Sedano
Office: AHF B57C
Office Hours: Mondays, 12-1 p.m. and Tuesdays 2-3 p.m. PT. Also available by appointment via email.
Contact Info: sedano@usc.edu, 213-740-9582

Lab Instructor: Jason Knowles
Office: AHF B55
Office Hours: Mondays, 10-11 a.m. and Thursdays 10:30-11:30 a.m. PT. Also available by appointment via email.
Contact Info: 213-740-5910

Lab Instructor: Su Jin Lee
Office: AHF B55K
Office Hours: Mondays 11 a.m.-12 p.m. and Tuesdays 2-3 p.m. Also available by appointment via email.
Contact Info: sujinlee@usc.edu, 213-740-2845

Library Help: Andy Rutkowski
Office: VKC 36B
Office Hours: Tuesdays 10 a.m.-12 p.m. and Thursdays 4:30-5:30 p.m. PT
Contact Info: arutkows@usc.edu, 213-740-6390, http://bit.ly/andyhangout

IT Help: Richard Tsung
Office: AHF B57E
Office Hours: By appointment
Contact Info: ctsung@usc.edu, 213-821-4415

Course Scope and Purpose

Maps have long played a role in the production and use of geographic information. They support many different kinds and levels of spatial reasoning ranging from simple queries (route finding, proximity analysis) to more advanced forms of spatial analysis and modeling. There has been a recent explosion in geographic information (GI) technologies the past two decades, which range from quick visualization tools (Google, Bing Maps) to sophisticated GISystems (ArcGIS, Idrisi) and many kinds of GPS-enabled sensors. These tools have attracted large numbers of users: social workers use GIS to track where clients live and where more social services are needed, urban planners use GIS to analyze the transformation of city spaces, landscape architects use GIS to design and track the status of their individual project sites, anthropologists use GIS to map the changing cultural patterns of a neighborhood, historians use GIS to map historical transformation across space, environmental scientists use GIS to track how natural disasters and groundwater flows interact with human-environment systems, and emergency responders use GIS to track where earthquake or hurricane survivors need assistance – to name a few.

Taken as a whole, this course provides a broad understanding (theoretical and technical) for later work with geographic information, regardless of background and/or academic interests. It covers the geographic information technologies and spatial skills needed to map, model, and predict how physical and social phenomena develop and change. In these ways, the spatial sciences can significantly affect the way research is conducted, profoundly impact the way we understand the world, and help us to prepare plans and designs that would dramatically improve the quality of life for those whose life experiences and prospects are shaped by spatial processes.

This course is designed to serve several different student audiences given its role as a required course in the B.S. in GeoDesign, B.S. in Environmental Studies, and minor in Spatial Sciences. Each student is encouraged to utilize the laboratory experience and self-directed capstone research project to explore geospatial resources and computational techniques, such as data modeling, spatial analysis, and data visualization, learning with their own academic and professional goals in mind.

Learning Objectives

Students who excel in SSCI 301L will be able to:

- Explain how modern geographic analysis and visualization tools can be used across a variety of disciplines;
- Describe the main types of maps and discuss the issues that underlie geographic modeling and the creation of maps;
- Demonstrate the understanding of data representation methods by creating meaningful maps; and
- Apply modern mapping and GIS technologies to problem solving within diverse fields of study.

Prerequisite(s): None
Co-Requisite (s): None
Concurrent Enrollment: None
Recommended Preparation: None

Course Structure

This is a four-credit course comprised of lectures (two per week) and lab (one per week). The lecture sessions will discuss various aspects of cartography, spatial reasoning, and the hardware and software systems used to investigate these processes. The weekly lab meetings are designed to introduce you to the tools of scientific inquiry and to give you practical experience in implementing these tools to explore various problems within the framework of the scientific method. The lecture and lab sessions are designed to complement each other to provide you with sound theoretical reasoning and the technical skills to investigate various physical and/or social processes. Your weekly laboratory assignments will be graded and returned, and the mid-term and final project will have a laboratory component to them. **It is required that you register for both the lecture and one laboratory session for this course.**

Please note that all course materials and correspondence will be posted on the course Blackboard website. As a registered student you will find this course available for you to access at 10 a.m. Pacific Time on the first day of classes**.**

Technological Proficiency and Hardware/Software Required

The modeling software and geospatial data required for course assignments will be accessed using computing resources provided by the Spatial Sciences Institute. No previous experience is required.

Required Readings

The required textbooks for this course are:

- Smith, David, Strout, Nathan, Harder, Christian, Moore, Steven, Ormsby, Tim, and Balstrom, Thomas. 2017. *Understanding GIS: An ArcGIS Pro Project Workbook* (First Edition). California, Esri Press 9781589484832. (Available in September)
- Harvey, Francis. 2016. *A Primer of GIS: Fundamental Geographic and Cartographic Concepts* (Second Edition). New York, Guilford Press.
- Monmonier, Mark. 1996. *How to Lie with Maps* (Second Edition). Chicago, University of Chicago Press.

The following readings will be posted to Blackboard:

- Goodchild M. 2007. *Citizens as Sensors: The World of Volunteered Geography*. GeoJournal 69(4) 211-221.
- Harley J B. 2001. *The New Nature of Maps*. Baltimore, MD, The Johns Hopkins University Press.

- Holloway S L, Rice S P, and Valentine G. (Eds.). 2003. *Key Concepts in Geography*. London, Sage Publications.
- Hubbard P, Kitchin R, Bartley B, and Fuller D. 2002. *Thinking Geographically*. New York, Continuum.
- Hjellström B. 1994. *Be Expert with Map & Compass*. New York, Collier Books.
- Kyrgier J and Wood D. 2016. *Making Maps: A Visual Guide to Map Design for GIS*. New York, Guilford Press.
- McIntosh-Tolle L. *How to Use a Compass*. REI. https://www.rei.com/learn/expert-advice/navigation-basics.html. Accessed 2018.
- Van Oort P. 2005. *Spatial Data Quality: From Description to Application* (Doctoral dissertation). Netherlands Geodetic Commission, Delft.
- Zeiler M and Murphy J. 2010. *Modeling Our World: The Esri Guide to Geodatabase Concepts*. California, Esri Press.

Description and Assessment of Assignments

Your grade in this class will be determined on the basis of several different assessments:

In-Class Participation and Twitter Posts (10%): A grade for the semester will be assigned based on your engagement in class and social media (Twitter) interactions. Students are expected to complete and discuss assigned reading, engage in lecture, share and discuss course assignments, and complete and discuss in-class assignments, among other forms of active engagement in the course. Students will be required to engage with and share course concepts via Twitter. Although we will sometimes use Twitter in the classroom, the bulk of your Twitter activity will take place outside of class. You will be required to tweet a minimum of two (2) times per week. There are a few simple guidelines for tweeting. Your tweets must: 1) be relevant to the class (i.e., a response to a reading, a link to a related article, a map or image, a question, etc.); 2) be substantive; 3) be respectful; and 4) include the hashtag #SSCI301 to ensure that tweets are incorporated into the class discussion. Any tweets that do not contain this hashtag will not be counted towards weekly activity. If you tweet the requisite number of times (a minimum of two tweets per week 2 x 15 = 30 total tweets), and participate in class you will receive full credit. If not, then you will receive partial credit commensurate with your participation.

Laboratory Assignments (20%): This course includes a laboratory meeting each week to develop technical competency with geospatial software platforms and analytic tools. There will be a total of ten laboratory assignments over the course of the semester, and one week will include a field assignment within greater Los Angeles.

Laboratory Practical (15%): The lab practical serves as an examination of your proficiency with the Esri Ecosystem. The scope of the lab practical will be limited to geospatial tools that have been introduced and explored in this course. Students will take the Practical during their scheduled lab section.

Midterm Exam (15%): The midterm exam will consist of multiple choice, short answer, and simple problem questions. Students will sit for the exam during the scheduled lecture period.

Final Project (20%): The final project is the capstone assignment for this course. Students will be expected to draw upon course lectures, discussions, lab assignments, readings, and outside sources to organize and deliver a self-directed study on a topic of interest utilizing spatial analysis and geospatial technologies. The three deliverables for this project are: 1) a project proposal; 2) a report that is limited to 10 pages (12-point font, 1 inch margins, single-spacing) that includes one or more maps, tables, and other diagrams, as well as a list of references; and 3) an oral presentation in class.

Final Exam (20%): The final exam will consist of multiple choice, short answer, and simple problem questions.

Grading Breakdown

Assessment	Number	Total Points (% of Grade)
In-Class Participation and Twitter Posts	30	10
Laboratory Assignments	10	20
Laboratory Practical	1	15
Midterm Exam	1	15
Final Project	1	20
Final Exam	1	20
Totals	44	100

Assignment Submission Policy

Students are expected to attend and participate in every class and lab session and to complete and upload all assignments before the deadlines detailed in the Course Schedule. Written assignments must be submitted via Blackboard. Late work will be assessed a penalty of 10% per day up through seven days following the due date, after which work will not be accepted.

Course Schedule: Weekly Breakdown

	Topic	Readings and Assignments	Deliverables/ Due Dates
Week 1 1/8 1/10	**Introduction to the Course** Introduction to the class and discussion of goals, assignments, projects, technology, and the value of spatial thinking. **Maps and Spatial Reasoning** A discussion of theories and techniques for analyzing human and environmental processes	Reading: Harvey Chapter 1 & 15 (GIS in a Nutshell to end); Hubbard et al. Chapter 1; Monmonier Chapter 1; Krygier and Wood Chapter 4 (optional)	2 tweets/Due by 1/12 No lab
Week 2 1/15 1/17	**MLK Holiday (no class)** **Types of Maps & Digital Representation of Data** Discussion of methods and issues relating to representing the physical world in digital and print maps. Introduction to Lab activity.	Reading: Harvey Chapters 2 & 10; Krygier and Wood Chapter 3 (pp. 66-73); Monmonier Chapters 5 & 6	2 tweets/Due by 1/19 Lab Report: Exploring maps/Due one week after lab
Week 3 1/22 1/24	**History of GIS** A discussion on the history, uses, and innovations of GIS, GTCM **Geodesy; Geoids, Spheroids and Coordinate Systems** Overview of concepts and terms relating to coordinate systems	Reading: Harvey Chapters 4 & 6; Monmonier Chapter 10	2 tweets/Due by 1/26 Lab Report: Census data and political boundaries/Due one week after lab
Week 4 1/29 1/31	**Projections** Discussion and explanation of map projections **Scale** Discuss concept of scale in cartography as well as physical and social processes	Reading: Harvey Chapter 3 & 5; Herod Chapter 12; Krygier & Wood, Chapter 5 (optional); Monmonier Chapter 2 (pp. 5-18)	2 tweets/Due by 2/2 Lab Report: UGIS Lessons 1 – 3/Due one week after lab
Week 5 2/5 2/7	**Final Project Discussion** Discuss expectations and past examples of capstone project **Cartography and Graphic Elements** Discussion of map design principles, symbology, and cartographic technique. The use of graphics to communicate, stylize, and problem solve	Reading: Harvey, Chapter 11; Krygier and Wood Chapter 7 (for reference for lab); Monmonier Chapter 2 (18-24), 3 & 11	2 tweets/Due by 2/9 Lab Report: UGIS Lessons 4 – 5/Due one week after lab

	Topic	Readings and Assignments	Deliverables/ Due Dates
Week 6 2/12 2/14	**Data Resources** Explore and discuss spatial data sources for spatial analysis, the "New" World of data, research methods **Spatial Data Quality** Discussion on evaluating and maintaining spatial data quality	Reading: Farivar (all); Monmonier Chapter 4 & 9; van Oort Chapters 1 & 2	2 tweets/Due by 2/16 Lab Report: Map Production: Result of UGIS Lesson 6/Due one week after lab Note: Self-work UGIS Lessons 7 – 9 DUE Week 10
Week 7 2/19 2/21	**President's Day (no class)** **Orienteering** Discussion and exercise with traditional methods for wayfinding	Reading: Hjellström (selected sections); McIntosh-Tolle (all)	2 tweets/Due by 2/23 Lab Report: Evaluating Core Geospatial Datasets/Due one week after lab
Week 8 2/26 2/28	**Global Navigation Satellite Systems** Overview of technologies and uses of GNSS and GPS (hand out GPS units this week) **Geospatial Data Collection and Correction** Discussion of geospatial data collection workflows and primary data collection in the field – Trimble introduction & distribution	Reading: Harvey Chapters 8	2 tweets/Due by 3/2 Lab: do not meet during scheduled times; conduct team fieldwork – data collection with Trimble handheld - parks
Week 9 3/5 3/7	**Review session for midterm** **Midterm Exam (in-class)**	Review for Midterm	2 tweets/Due by 3/9 Lab Report: Data correction and processing from fieldwork; mapping of data/Due one week after lab
Week 10 3/19 3/21	**Project Proposal** In class peer-review of final project proposal, including proposed data **Remote Sensing** Overview of remote sensing technologies and uses	Reading: Harvey Chapter 9	2 tweets/Due 3/23 Lab: Lab Practical Self-work: UGIS Lessons 7 – 9/Due 3/23

	Topic	Readings and Assignments	Deliverables/ Due Dates
Week 11 3/26 3/28	**Remote Sensing in Practice** Overview of the professional uses of remote sensing **Crowdsourcing Spatial Data** Overview of technologies and cultural changes leading to data creation and mapping by non-professionals	Reading: Harvey Chapter 14; Goodchild (all)	2 tweets/Due 3/30 Lab Report: Visualization of remotely sensed data using Google Earth Pro/Due one week after lab
Week 12 4/2 4/4	**Volunteered Geographic Information** Overview of technologies and uses of crowd-sourced data; fitness for use and quality management **Spatial Databases** An introduction to spatial databases – utility, design, and maintenance	Reading: Harvey Chapter 7; Zeiler and Murphy Chapter 1	2 tweets/Due 4/6 Lab Report: Creating VGI/Due one week after lab
Week 13 4/9 4/11	**Administration of Spaces and Locational Privacy** Overview of government and private sector data and issues related to data collection and analysis **Maps, Knowledge, & Power** Discussion of mapping issues and the power inherent in creating maps and its historical consequences	Reading: Harvey Chapter 12 & 13; Harley Chapter 2; Monmonier Chapter 7, 8 & 9	2 tweets/Due by 4/13 Lab Report: Work on Final Project/Lab Report (progress report) due one week after lab
Week 14 4/16 4/18	**Spatial Statistics/The Future of GIS** Introduction to the use of spatial statistics in spatial analysis. Advances and trends in GIS and geospatial technologies; an introduction to SSCI 382 topics **Final Exam Review**	Reading Harvey Chapter 15 (First 2 sections), 16 & 17	2 tweets/Due by 4/20 No lab
Week 15 4/23 4/25	**Final Project Presentations** Students present their final projects in class **Final Project Presentations** Students present their final projects in class		2 tweets/Due by 4/27 No lab Final Project Written Reports/Due by 4/27
5/7	**Final Exam (2-4 p.m.; WPH 102 (regular lecture hall); 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
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 microaggressions 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