SSCI 301L – MAPS AND SPATIAL REASONING

Course: SSCI 301L – Maps and Spatial Reasoning
Sections: 35712R (Lecture); 35713R (Lab)
Lecture: Monday & Wednesday 2-3:20pm
Lab: Wednesday 12-1:50pm
Location: AHF (Allan Hancock Foundation) B57A
Website: www.blackboard.usc.edu

Instructor: Dr. Darren Ruddell
Office: AHF Building B57F
Email: druddell@usc.edu
Website: http://spatial.usc.edu
Skype: darren.ruddell
Twitter: @SSI_Prof

Office Hours: Tuesday and Thursday 11:30am-12:30pm and by appointment. I am happy to meet in person or asynchronously via email. I am also available via Skype or Adobe Connect most days provided we schedule the meeting in advance. Please take advantage of office hours – it is a great resource.

1. Introduction
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 include 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: for example, social workers use GIS to track where clients live and where more social services are needed, planners use GIS to analyze the transformation of city spaces as urban areas develop, 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.

Taken as a whole, this course provides a broad understanding (theoretical and technical) for later work with geographic information, regardless of background. 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 if implemented.

2. **Course Objectives**

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

- Explain how and why organizations (i.e., public, private, and not-for-profits) produce and use geographic data, including topographic maps, remotely sensed imagery, and thematic maps to portray census and various types of community, social, and natural resource information;

- Explain how modern geographic analysis and visualization tools can be used to advance our knowledge and understanding of human and environmental activities and events from a variety of disciplinary perspectives;

- Describe the goals and contents of key geographic applications such as Bing maps, Google Earth, MapQuest, OpenStreetMap, and the U.S. National Map.

3. **Course Organization**

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 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 exams will have a laboratory component to them. **It is required that you register for both the lecture and laboratory session for this course.**

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

4. **Course Assessment**

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<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>In-class Assignments</td>
<td>10%</td>
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<tr>
<td>Laboratory Assignments</td>
<td>25%</td>
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<tr>
<td>Social Media Interactions</td>
<td>10%</td>
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<td>Midterm Examination</td>
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<tr>
<td>Laboratory Practical</td>
<td>15%</td>
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<td>Final Project</td>
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Please note that no make-up opportunities will be offered for missed tests or exams. If you have a known conflict, speak with me as soon as possible so we can make alternative arrangements.

5. **Social Media – Twitter**

The social media site Twitter has been gaining tremendous currency in the academic world as an instrument for sharing information, commenting on issues related to higher education, as well as addressing challenges in a given field, such as geospatial technologies. As such, it has achieved acclaim
for its use as a pedagogical tool to extend the work of the classroom. We are going to use Twitter in this course to complement assignments and activities, in addition to augmenting the analytical work of the class. Beyond its relevance to the coursework, though, you are encouraged to explore the site as to its possibilities for professional networking for yourselves. Make sure to follow me (@SSI_Prof), other members of the class, in addition to following leaders in your field.

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 3 times per week (at least three tweets each week for weeks 1-15 of this course). There are a few simple guidelines for tweeting: 1) they must 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) they must be substantive; and 3) they must be respectful. In addition to reading your tweets on a regular basis, I will be using an online archiving tool to keep track of Twitter activity.

You must use the hashtag #SSCI301 to ensure that your tweets are incorporated into the class discussion. Any tweets that do not contain this hashtag will not be counted because the website will not record their activity.

Twitter activity for the course will be graded on a pass/fail basis. If you tweet the requisite number of times (a minimum of three tweets per week – or 3X15 = 45 total tweets), you will receive an A for this assignment. If not, then you will receive an F.

6. Textbooks

Required Texts:

Related Texts:
7. Academic Accommodations

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP and it should be delivered to me early in the semester. DSP is located in STU 301 and is open from 8:30am to 5:00pm, Monday through Friday (213-740-0776; study@usc.edu).

8. Academic Integrity

Academic integrity is a foundational principle of our community and ensuring the highest standards of academic integrity is the collective responsibility of faculty, students, and administrators. There is a process in place to deal with such incidents as cheating, unauthorized collaboration and plagiarism. The Trojan Integrity Guide can be found at http://www.usc.edu/student-affairs/SJACS/forms/tio.pdf and the Undergraduate Guide for Avoiding Plagiarism can be found at http://www.usc.edu/student-affairs/SJACS/forms/tig.pdf.

9. Important Administrative Dates

8/25: Fall semester classes begin
9/1: Labor Day, university holiday
9/12: Last day to register and add classes, change enrollment option to Pass/No Pass or Audit, or to drop a class without a mark of “W” and receive a 100% refund
11/14: Last day to drop a class with a mark of “W”
11/26-29: Thanksgiving recess, university holiday
12/5: Fall semester classes end
12/6-9: Study days
12/17: Final examination (8-10:00am)

10. Course Outline

The course will be organized around the following four modules and the accompanying lecture and laboratory topics.

Module 1: Core Concepts

8/25: Introduction to Course
8/27: Maps and Spatial Reasoning
   Read Harvey (Chapter 1, pp.3-33)

9/1: University Holiday
9/3: GTCM and Geographic Representation and Choices for Cartographic Representation
   Read Harvey (Chapter 2, pp. 34-52)

Module 2: Map Principles

9/8: From a Round to a Flat Surface: Projections
9/10: Additional Choices in Map Making
   Read Harvey (Chapter 3, pp. 53-72)
9/15: Making Projections: Earth Models and Datums
9/17: Types of Projections and Their Characteristics
Read Harvey (Chapter 4, pp. 75-101)

9/22: Ruddell away – cartographic representation
9/24: Ruddell away – take-home assignment
Read Harvey (Chapter 5, pp. 102-126)

9/29: Projections throughout History
10/1: How to Set Locational and Coordinate Systems
Read Harvey (Chapter 6, pp. 127-138)

Module 3: Spatial Analysis and Reasoning

10/6: Databases
10/8: Geographic Information Systems
Read Harvey (Chapter 7, pp. 139-159)

10/13: Geographic Positioning Systems
10/15: GIS Day preparation
Read Harvey (Chapter 8, pp. 160-173)

10/20: Mid-term Exam
10/22: Conduct field work
Read Harvey (Chapter 9, pp. 174-189)

10/27: Map Types
10/29: Guest Lecture: Andy Rutkowski
Read Harvey (Chapter 10, pp. 193-220)

11/3: Remote Sensing
11/5: Remote Sensing in Practice
Read Monmonier (whole book) plus Harvey (Chapter 11, pp. 221-250)

11/10: Government Mapping Agencies and the Administration of Spaces
11/12: Crowd Sourcing and Volunteered Geographic Information
Read Harvey (Chapter 12, pp. 253-250)

11/17: Geographic Information and Spatial Analysis; Examples of Spatial Analysis
11/19: GIS Day
Read Harvey (Chapter 13, pp. 253-270)

11/24: Geostatistics
11/26: Thanksgiving Holiday  
*Read Harvey (Chapter 14, pp. 271-289)*

### Module 4: Future Challenges and Opportunities

12/1: Future of Spatial Thinking; Work on Final Project  
12/3: Present and Submit Final Project  
*Read Harvey (Chapters 15, pp. 290-299)*

### 11. Laboratory Topics & Protocols

The laboratory sessions will be organized around the following lab topics. The dates shown to the left of the individual topics indicate the date of a given lab activity. Each lab assignment is due at the beginning of the next lab session.

#### Getting Started in the SSI Computer Lab

8/27: Log-in, Data Access, and Software System

#### ArcGIS Skill Development and Acquisition

9/3: Lesson 1a: Explore the study area  
9/10: Lesson 1b: Do exploratory analysis  
9/17: Lesson 2: Preview data  
9/24: Lesson 3: Choose the data

10/1: Lesson 4: Build the database  
10/8: Lesson 5: Edit data  
10/15: Lesson 6: Conduct the analysis  
10/22: Lesson 6 continued: Field work -- feasibility assessment  
10/29: Lesson 7: Automate the process

11/5: Lesson 8: Present analysis results  
11/12: Lesson 9: Share results online  
11/19: GIS Day  
**11/26: Lab Practical**

Each lab session will start on the hour and will begin with a brief introduction to the topic of investigation. These introductions will take no longer than 10 minutes – make sure to arrive to lab on-time so you do not miss introductory comments. Some self-guided work tasks using one or more geospatial datasets will then follow for the remainder of the lab session. Lab sessions will also include a roundtable discussion of the tasks completed, what it means, and how these tasks might have been varied and/or enhanced if performed by professionals in a real world setting.