SSCI 593 (Section 35737), Geospatial Data Integration

Tentative Schedule

Syllabus

Units: 4

Term — Day — Time: Spring, 2016 (online)

Location: Online

Instructor: Katsuhiko “Kirk” Oda, Ph.D.
Office: AHF B55J
Office Hours: Mondays and Wednesdays, 9:00-10:00 a.m. PT
Contact Info: katsuhio@usc.edu, 213-740-2868 (office), https://bluejeans.com/2137402868 (Bluejeans).

GIS Librarian Help: Katharin Peter
Office: VKC B40a
Office Hours: By appointment
Contact Info: kpeter@usc.edu, 213-740-1700 (office)

IT Help: Richard Tsung
Hours of Service: Mondays to Fridays, 9:00 a.m.-5:00 p.m. PT
Contact Info: ctsung@usc.edu, 213-821-4415 (office)
Course Description
Data integration is key to the successful application of GIS to help address today’s environmental and social challenges. Data integration is the process of combining data residing in different sources and providing users with a unified view of these data. This process becomes significant in a variety of situations, which include both the commercial (i.e., companies needing to merge their databases) and scientific (i.e., combining research results from different repositories) domains. Data integration has come into play increasingly as the volume and need to share existing data continue to expand exponentially. In fact, the easy access to very advanced data sources and spatial tools in today’s GIS is deceptive as it is fairly simple to walk through wizards and push buttons to perform a data extraction or analysis, but it is much more difficult to choose among similar data from different sources and to determine their correct use in GIS-based environments. This course builds on SSCI 587: Spatial Data Acquisition by considering several additional data streams and the impacts of data quality and related issues on data integration. Students will explore and use various kinds of data such as Volunteered Geographic Information (VGI) or crowdsourced data, and other forms of geospatial data available through public spatial data infrastructures and web portals. The tools and concepts we will cover apply to medium to advanced data integration and analysis tasks in GIS-based environments. Students will explore these concepts using both proprietary and open source platforms.

This course will provide you with an understanding of public domain data types and resources from both the social and scientific domains. It will also teach you how to access public data types, and to explore, assess, pre-process and use them in various integration approaches for GIS-based analysis and applications in real world settings. Helping you to become an informed data integration analyst is the goal of this course.

The workplace expectations for today’s GIS professionals include the ability to learn continuously, work with many different kinds of data and with professionals in other disciplines, domains, and agencies. There are many unique and deep skill sets needed in today’s world. However, they do not standalone; the ability to collaborate, to learn from others, and to expand opportunities jointly are required in today’s workplace and mean that the collaborative component of this course is essential.

This is a graduate level course, so you should expect this class to be intellectually challenging. As graduate students you are expected to engage with the information you are learning and to explore the heady cauldron of ideas, opinion, and analysis that describe our collective effort to thoroughly interrogate the subject at hand. Learning arises from active engagement with the knowledge found in our reading materials and with one another. As in any graduate class, the instructor’s role is that of a guide who keeps you on this path of discovery and you will find that you will learn much from your fellow classmates. This is especially the case within the milieu of “online learning.”
Learning Objectives
When you have completed this course, you will be able to:

- Develop strategies to capture geospatial data and any accompanying metadata from various sources.
- Identify, download and format vector and raster spatial data from an online spatial data portal.
- Identify spatial data from associated metadata files.
- Integrate multiple geospatial data sources in one or more GIS-based environments.
- Analyze spatial data in one or more GIS-based analysis environments.
- Assess and solve moderate to complex real-world geospatial problems.
- Evaluate the impacts of data quality on the outcomes of spatial analysis and decision making.
- Critically evaluate different methodologies for GIS-based integration and analysis and their impact on open distribution.
- Collaborate with others to contribute in an original GIS-based integration project relevant to real-world geospatial problems using Esri’s ArcGIS and other GIS tools.
- Evaluate the impact of the emerging cloud computing platforms on geospatial analysis and modeling.

Prerequisite(s): None
Co-Requisite(s): None
Concurrent Enrollment: None
Recommended Preparation: SSCI 587: Spatial Data Acquisition

Technological Proficiency and Hardware/Software Required
We have several technologies that will facilitate our course work and our interactions, despite our dispersed locations. These include:

Blackboard – All course materials and correspondence will be posted on the course Blackboard site. As a registered student, you will find this course will show up in your available classes no later than 12:00 noon PT on the first day of classes. It is here that the day-to-day flow of the course will be recorded.

Discussion boards – We will use the Blackboard site to post a number of discussion threads related to various sections of the course. I may or may not participate in these threads but they are vitally important when we get to some of the "hands-on" work as we
expect students to work "together" on these exercises, sharing hints and help, as you would do in a common laboratory classroom. Additional discussion threads may be used to organize asynchronous discussions.

**Live meetings and presentations** – We will use a browser-based service called Adobe Connect to create synchronous, interactive sessions. With voice and webcam capabilities, Adobe Connect can be used to share presentations and even our desktops between two or more people.

**Individual meetings** – We will use BlueJeans™ for one-on-one meetings. For those near the Los Angeles area, we encourage you to meet in person at the Spatial Sciences Institute.

**GIST server and tech support** – This course will utilize the GIST Servers to provide you with your own virtual desktop. You can access the GIST Server at http://gis-gateway.usc.edu. If you are unable to connect to the server or experience any type of technical issues, send an email to GIST Tech Support at gistsupport@dornsife.usc.edu and make sure to copy (cc) me on the email. GIST Tech Support is available Monday through Friday, 9:00 a.m. to 5:00 p.m. PT. A variety of geospatial software platforms (ArcGIS, e-Cognition, TerrSet, etc.) are provided online via the GIST Server; hence, you do not need to install it on your own computer. Instead, every student must satisfy the following technology requirements: (1) a computer with a fast Internet connection; (2) a functional webcam and a microphone for use whenever a presentation or meeting is scheduled; and (3) a modern web browser, Firefox is recommended, to access the GIST Server (in the event you want or need to).

**Required Readings and Supplementary Materials**

**Textbooks** – There are two texts for this course. Both of the texts are available through the USC Libraries as an e-Book.


**Readings** – Additional readings that focus on topics relevant to course themes will be provided through Blackboard.


Description and Assessment of Assignments

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

Resume Assignment (2%) – 1 for a total of 2 points. The GIST Programs require all current students to post and maintain a public resume, short biography and recent photo on our shared GIST Student Community Blackboard site. Please prepare your resume in the SSI template, which will be provided to you. Unless you opt out, your resume will be included in the Spatial Sciences Institute Graduate Programs Resume Book. This resume book is compiled annually and, along with our web presence, is used to promote our programs and more importantly, your skills, experience, and professional aspirations.

Discussion Forums (42%) – 14 for a total of 42 points. Weekly we will explore topics through graded discussion forums, blogs and/or wikis. These tasks are based on provided readings and are designed to engage you in the material and to expand your research results beyond what you are personally able to uncover.

Data Integration Exercises (24%) – 4 for a total of 24 points. These will be hands-on activities that will allow you to explore the real-world application scenarios of data integration using a variety of different data sources, data analysis and integration strategies.

Final Project (32%) – 4 components for a total of 32 points. The Final Project provides a group work opportunity to integrate all that you have learned in the semester. More details about the project will be provided as the course develops. However, the final project will be broken up into four distinct components with their own points and deadlines as follows: (1) a written proposal for your project and a group meeting for you to present and discuss your proposal and the various ways you might modify it; (2) a data report documenting the quality of data you have identified and acquired for your project; (3) a web app that show the results of your data integration; and (4) a final report will describe the problem or scenario that your will attempt to address, the data and technologies that you will choose for the project, the method that you will implement, the outcomes that you will obtain, and any implications and suggestions that you will conclude.

Careful planning and a serious, consistent commitment will be required for you to successfully navigate the various deliverables in this and other GIST courses. The table below summarizes the SSCI 593 course assignments and their point distribution:
Grading Breakdown

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Number</th>
<th>% of Grade</th>
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<tbody>
<tr>
<td>Resume Assignment</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Discussion Forums</td>
<td>14</td>
<td>42</td>
</tr>
<tr>
<td>Data Integration</td>
<td>4</td>
<td>24</td>
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<tr>
<td>Exercises</td>
<td></td>
<td></td>
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<tr>
<td>Final Project</td>
<td>4</td>
<td>32</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>100</td>
<td>100</td>
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Assignment Submission Policy
Assignments will be submitted for grading via Blackboard using the due dates specified in the Course Schedule below. And finally, it is important to note from the outset that: (1) late postings and assignments will be docked one grade and no grade will be given for postings or assignments turned in more than one week late; and (2) no written work will be accepted for grading after 5:00 p.m. PT on the last day of classes.

Additional Policies
Communications – This is a distance learning course, so most of our interactions will be asynchronous (not at the same time). All materials to be handed in will be submitted via Blackboard. I will also create Blackboard discussion forums throughout the semester that we will use for the aforementioned assignments and so we can discuss comments and issues related to the course assignments, exercises, and projects as the need arises.

In addition, I will send via email through Blackboard any notices that are time sensitive. Please be sure that you read as soon as possible all email sent from Blackboard or from me. Check now to make sure that mail sent from both the USC blackboard accounts and my private domain (katsuhio@usc.edu) does not go into your junk mail!

While I am usually online and will probably respond to emails from students relatively quickly, I will endeavor to respond to all email within 24 hours of receipt, aiming for no more than 48 hours delay. In the rare case when I expect to be offline for more than 72 hours, I will post an announcement on the Blackboard site. That said, 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 on the Announcement page in Blackboard. Be sure to check these each time you log onto Blackboard.

Workload – This is a four credit, one semester course. Students should expect to spend 10-15 hours per week completing the work in this course.
## Course Schedule: A Weekly Breakdown (Tentative)

<table>
<thead>
<tr>
<th>Week 1 1/11</th>
<th>Topics/Daily Activities</th>
<th>Readings and Homework</th>
<th>Deliverables/Due Dates</th>
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<tr>
<th>Week 2 1/19</th>
<th>Topics/Daily Activities</th>
<th>Readings and Homework</th>
<th>Deliverables/Due Dates</th>
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<tr>
<th>Week 3 1/25</th>
<th>Topics/Daily Activities</th>
<th>Readings and Homework</th>
<th>Deliverables/Due Dates</th>
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<tbody>
<tr>
<td>Week 4 2/1</td>
<td>Public Domain Data: Models and Issues</td>
<td>Kerski &amp; Clark (2012) <em>The GIS Guide to Public Domain Data</em>. Redlands, CA: Esri Press. (Ch. 2 Spatial Data Models, Vector Data, and Data Quality and Ch. 3 Raster Data and Privacy Issues)</td>
<td>Submit Discussion Forum 3 and Data Integration Exercise 1 no later than 5:00 p.m. on Wednesday, 2/3. Submit your response to Discussion Forum 3 and Data Integration Exercise 1 no later than 5 p.m. on Friday, 2/5.</td>
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<td>Week 5 2/8</td>
<td>Public Domain Data: Data Portals and Metadata</td>
<td>Kerski &amp; Clark (2012) <em>The GIS Guide to Public Domain Data</em>. Redlands, CA: Esri Press. (Ch. 5 National and State Data Portals and Metadata Standards)</td>
<td>Submit Discussion Forum 4 no later than 5:00 p.m. on Wednesday, 2/10. Submit your response to Discussion Forum 4 no later than 5 p.m. on Friday, 2/12.</td>
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<tr>
<td>Week 6 2/16</td>
<td>Public Domain Data: NSDI Framework</td>
<td>The Coalition of Geospatial Organizations (2015) <em>Report Card on the U.S. National Spatial Data Infrastructure</em>.</td>
<td>Submit Discussion Forum 5 and Data Integration Exercise 2 no later than 5:00 p.m. on Wednesday, 2/17. Submit your response to Discussion Forum 5 and Data Integration Exercise 2 no later than 5 p.m. on Friday, 2/19.</td>
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<td>Week 8 2/29</td>
<td><strong>VGI Public Participation: Typology of VGI</strong></td>
<td><strong>Elwood, Goodchild &amp; Sui (2012)</strong></td>
<td><strong>Rice, Paez, Mulhollen, Shore &amp; Caldwell. (2012)</strong> Crowdsourced Geospatial Data: A Report on the Emerging Phenomena of Crowdsourced and User-generated Geospatial Data (Ch. 3: Crowdsourced Geospatial Data Case Studies), Alexandria, VA: U.S. Army Topographic Engineering Center</td>
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<td>Week 9 3/7</td>
<td><strong>VGI Public Participation: Citizen Science</strong></td>
<td><strong>Connors, Lei, &amp; Kelly (2012)</strong> Citizen Science in the Age of Neogeography: Utilizing Volunteered Geographic Information for Environmental Monitoring, Annals of the Association of American Geographers, 102(6), 1267-1289. <strong>Elwood, Goodchild &amp; Sui eds. (2013)</strong> Crowdsourcing Geographic Knowledge: Volunteered Geographic Information (VGI) in Theory and Practice. New York, NY: Springer (Ch. 6 When Web 2.0 meets public participation GIS (PPGIS): VGI and spaces of participatory mapping in China and Ch. 7 Citizen science and volunteered geographic information: Overview and typology of participation)</td>
<td><strong>Discussion Forum 8</strong> Data Integration Exercise 4</td>
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<tr>
<td>Week 10 3/21</td>
<td><strong>VGI Geographic Knowledge Production: Emerging Applications</strong> Each student has a meeting for the Final Project.</td>
<td><strong>Elwood, Goodchild &amp; Sui eds. (2013)</strong> Crowdsourcing Geographic Knowledge: Volunteered Geographic Information (VGI) in Theory and Practice. New York, NY: Springer (Part III Emerging Applications and New Challenges, Chs. 14 – 18)</td>
<td><strong>Discussion Forum 9</strong> Final Project: Written Proposal</td>
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<td>Week 4</td>
<td>Future Trends: New Challenges in VGI and Crowdsourcing</td>
<td>Elwood, Goodchild &amp; Sui eds. (2013) Crowdsourcing Geographic Knowledge: Volunteered Geographic Information (VGI) in Theory and Practice. New York, NY: Springer (Ch. 20 The prospects VGI research and the emerging fourth paradigm)</td>
<td>Submit Discussion Forum 13 no later than 5:00 p.m. on Wednesday, 4/20. Submit Discussion Forum 13 no later than 5 p.m. on Friday, 4/22.</td>
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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 http://studentaffairs.usc.edu/scampus/. Other forms of academic dishonesty are equally unacceptable. See additional information in Scampus and university policies on scientific misconduct, http://www.usc.edu/schools/GraduateSchool/academic_conduct.html.

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://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. 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 https://dsp.usc.edu/ 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.