SSCI 592, Mobile GIS

Syllabus

Units: 4

Term — Day — Time: Summer 2017, Online

Location: Online

Instructor: Yao-Yi Chiang, PhD GISP
Office: AHF B55C
Regular Office Hours: Tuesday 4 to 5 p.m. and Thursday 11 a.m. to 12 p.m. Pacific Time. Also available most days and times by appointment via email.

Contact Info: yaoyic@usc.edu, https://bluejeans.com/5067546751 (BlueJeans), 213-740-7618 (office), yaoyichiang (Skype).

Library Help: Sherry Mosley
Office: VKC B40C
Office Hours: By appointment
Contact Info: smosley@usc.edu, 213-740-8810 (office)

IT Help: Richard Tsung
Office: AHF 145D
Office Hours: By appointment
Contact Info: ctsung@usc.edu, 213-821-4415 (office)
Course Scope and Purpose

This course is designed to immerse you in the fundamental programming concepts and cutting-edge technologies that support mobile GIS development. It is an elective course for the GIST M.S. as well as the GIST, Geospatial Intelligence, and the Geospatial Leadership Certificate Programs. There is no textbook for this class since we will be using the most recent online programming resources, including public discussion forums, SDK (software development kit) tutorials, and cloud-based services (e.g., Parse.com and Carto.com). In addition, you must be comfortable using the web to clarify concepts and terms that come up in the course when you do not understand them. Due to the rapidly changing nature of programming techniques, libraries, and SDKs, online searches and existing discussion boards around the web are where to find the latest up-to-date information pertaining to programming mobile devices and GIS. These technologies are all very new and are quickly changing so we will all be learning together throughout the semester. Be sure to share with everyone and post to the message board whenever you find something new and interesting.

Learning Outcomes

On completion of this course, students should be able to:

- Evaluate the advantages, disadvantages, and major challenges of creating and working with mobile GIS applications
- Describe how mobile GIS and spatial concepts create powerful communication tools
- Understand the key similarities and differences between various mobile GIS technologies, including software applications and hardware devices
- Critically assess contemporary mobile GIS technologies
- Design, program and implement a mobile GIS application.

Prerequisite(s): None
Co-Requisite(s): None
Concurrent Enrollment: None
Recommended Preparation: You do NOT need prior programming experiences to take this course. The first two learning modules in this course will guide you to learn object-oriented programming and concepts such as variables, loops, and logic. The remaining course modules will enable you to build an Android mobile application.

Course Structure

The course will be taught as an online class. Class meetings will be used to discuss the assigned readings and any questions and related topics that arise from the readings. The first class meeting will be held during Weeks 3 & 4. (See the schedule table.) We will meet online using BlueJeans. Later in the class, we will discuss and set further meetings if needed. The learning and teaching strategies are student-centered. They aim to encourage a deep-learning approach by using reflection and self-evaluation. The individual class sessions will be organized around class readings that are designed to provide the essential background and framework for study.
Students will be required to reflect on their learning through Blackboard discussions and a series of carefully crafted assignments.

*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.

**Technological and Communication Requirements**

Every student is required to purchase an Android device for the class. It is important to double check that your Android device has the latest operating system, a GPS sensor, Wi-Fi support, and computational power that matches at least the specification of the Google Nexus 7 tablet. Please note that the 2013 version of Google Nexus 7 tablet does not support the latest Android operating system (Android Nougat), which is fine for the class, but you might want to consider a newer Nexus device to use the new features in Android Nougat. All course assignments including the final project will be completed using this Android device. Note that, although there are literally thousands of various types of Android devices, we will not provide additional tech support for non-Nexus devices.

In addition to an Android device, every student must have the following technology requirements:

- A computer with a fast Internet connection.
- A functional webcam and a microphone for use whenever a presentation or meeting is scheduled.
- An up-to-date web browser to access the SSI Server

**SSI Server and Tech Support** – This course will utilize the SSI Servers at https://gistonline.usc.edu to provide you with your own virtual desktop. If you are unable to connect to the server or experience any type of technical issues, send an email to SSI Tech Support at spatial_support@usc.edu (spatial underscore support at usc dot edu). Please be sure to copy (cc) me on the email. A variety of geospatial software platforms (ArcGIS, e-Cognition, TerrSet, etc.) is provided online via the SSI Server; hence, you do not need to install them on your own computer.

**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. 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.

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. Do not ignore course email until the day before assignments are due. Also double check to be sure that email sent from the USC blackboard account does not go into your junk mail!

While I am usually on-line all day and will probably respond to emails from students very quickly, I will endeavor to respond to all email within 24 hours of receipt, aiming for no more
than 72 hours delay. In the rare case when I expect to be off-line for more than 72 hours, I will post an announcement on the Blackboard site.

Discussion forums – On the Blackboard site, I will post a series of discussion threads relevant to various sections of the course. Discussions provide a key means for student-to-student discussion and collaboration that can replicate the face-to-face contact you may have experienced in traditional classrooms. Here students can provide support to each other while working on your assignments, sharing hints and helpful tips, as you would in a classroom laboratory. Please post your questions about assignments there, as you would ask them publically in the classroom. I monitor the discussion threads and offer comments when necessary, but more importantly, consider the discussion board a key way to connect with your classmates and share your discoveries.

Required Readings and Supplementary Materials

The weekly readings will be accessed via the USC Library’s electronic collections and / or provided by the instructor via Blackboard.

Description and Assessment of Assignments

Weekly Assignments

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

Resume Assignment (2%) – One assignment for a total of 2 points: We require all current students to post and maintain a public resume, short biography, and recent photo on our shared Spatial Sciences Institute Student Community Blackboard site. Unless you opt out, your photo and resume will be posted to the Spatial Sciences Institute website and your resume will be included in the Spatial Sciences Institute Resume Book. The latter is compiled annually and along with our web presence used to promote our programs and more importantly, your skills, experience, and professional aspirations.

Major Assignments (50%) – Five assignments for a total of 50 points: You will read and work through a series of tutorials in programming languages and various APIs associated with mobile devices during the first ten weeks of the semester. Their objective is to help you evaluate and integrate the information you have acquired from the course readings. Some of these will involve discussions and collaborative work, some will be individual efforts. The various contributions will be submitted in five assignments at approximately two-week intervals.

Quizzes (10%) – Two quizzes for a total of 10 points: You will work through a series of class materials and hand-on tutorials in mobile programming concepts during the first six weeks of the semester. You will take two quizzes on the Blackboard to test your understanding of object oriented programming and Android.

Final Project (38%) – One final project including four components for a total of 38 points: The Final Project is your opportunity to integrate all that you have learned in the semester and will require you to:
1. Design a mobile GIS application for a specific purpose and audience of your choice.
2. Select and implement your chosen mobile GIS application in your production environment.
3. Implement user capabilities based on your application’s goals and deliverables.
4. Produce a final report and accompanying video product that demonstrates the results of your final project work.

The grades for the final project will be spread across four components as follows: (1) the proposal describing the proposed project, including software to be implemented and any data to be acquired (8 points); (2) weekly project updates posted to the discussion board (8 points); (3) a final report documenting the plan and purpose of the project, the mobile GIS application, the development and implementation of the application, issues encountered while completing the project, and future possibilities (12 points); and (4) a recorded demo presentation video of your final project with voiceover demonstrating your mobile GIS application and its capabilities (10 points).

**Grading Breakdown**

Careful planning and a serious, consistent commitment will be required for you to successfully navigate the various deliverables in this and other SSI graduate courses. The table below summarizes the SSCI 592 course assignments and their point distribution:

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Number</th>
<th>Points Each</th>
<th>Total Points</th>
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</thead>
<tbody>
<tr>
<td><strong>Weekly Assignments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resume assignment</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Major assignments</td>
<td>5</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Quizzes</td>
<td>2</td>
<td>5</td>
<td>10</td>
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<tr>
<td><strong>Project Components</strong></td>
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<tr>
<td>Proposal</td>
<td>1</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Weekly updates</td>
<td>4</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Final Report</td>
<td>1</td>
<td>12</td>
<td>12</td>
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<tr>
<td>Final Presentation/Video</td>
<td>1</td>
<td>10</td>
<td>10</td>
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<tr>
<td><strong>Totals</strong></td>
<td>15</td>
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<td>100</td>
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Assignment Submission Policy

Unless otherwise noted, all assignments and quizzes are due by 11:59 pm Pacific Time (PT) on Mondays. In most cases, assignments must be submitted via Blackboard. Project components have different due dates as indicated on the Course Schedule below. Your attention to on-time assignment submission is essential.

Strict penalties apply for late assignments as follows:

- All assignments will be penalized 2 points up to SEVEN days late. No points will be given for submissions more than SEVEN days late. Note that all assignments worth 2 points will receive 0 points if submitted late.
- Additionally, no written work will be accepted for grading after 11:59 pm Pacific Time (PT) on the last day of classes.

Schedule

<table>
<thead>
<tr>
<th>Week 1 5/17</th>
<th>Topic</th>
<th>Readings and Assignments</th>
<th>Deliverables/Due Dates</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Introduction to Java and Android Technology</td>
<td>Class notes on programming fundamentals</td>
<td>No deliverables</td>
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<tr>
<td></td>
<td>Introductions to the course materials and the basics of mobile GIS development, including a discussion of class goals, projects, technologies, reading assignments</td>
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<thead>
<tr>
<th>Week 2 5/22</th>
<th>Topic</th>
<th>Readings and Assignments</th>
<th>Deliverables/Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Object-Oriented Design, Programming and Mobile Fundamentals (Esri AppStudio)</td>
<td>Class notes on Java, object-oriented design, Keyhole Markup Language, and Esri AppStudio</td>
<td>1) Submit resume on the Blackboard no later than 11:59 p.m. PT on Monday, 5/22 1) Submit assignment 1 and 2) “Object-oriented Programming and Java” quiz on the Blackboard no later than 11:59 p.m. PT on Monday, 6/5</td>
</tr>
<tr>
<td></td>
<td>Learning object-oriented design and Java for building mobile GIS applications</td>
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<thead>
<tr>
<th>Week 3 5/30*</th>
<th>Topic</th>
<th>Readings and Assignments</th>
<th>Deliverables/Due Dates</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Object-Oriented Design, Programming and Mobile Fundamentals (Esri AppStudio)</td>
<td>Class notes on Java, object-oriented design, Keyhole Markup Language, and Esri AppStudio</td>
<td>Schedule an individual meeting with the instructor no later than 11:59 p.m. PT on Monday, 6/5</td>
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<td>*Monday, 5/29 is a university holiday</td>
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<tr>
<th>Week 4 6/5</th>
<th>Topic</th>
<th>Readings and Assignments</th>
<th>Deliverables/Due Dates</th>
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<tbody>
<tr>
<td></td>
<td>Java and Android</td>
<td>Class notes on Android development, Eclipse, and Android code samples</td>
<td>1) Submit the full assignment 2 on Blackboard no later than 11:59 p.m. PT on Monday, 6/12</td>
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<td>Learning how to use Java specifically in the Android environment, including hands-on exercises to</td>
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<thead>
<tr>
<th>Week 5 6/12</th>
<th>Topic</th>
<th>Readings and Assignments</th>
<th>Deliverables/Due Dates</th>
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<tbody>
<tr>
<td></td>
<td>Java and Android</td>
<td>Class notes on Android development, Eclipse, and Android code samples</td>
<td>1) Announce your sample ownership for assignment 3 and 2) finish the “Android” quiz on the Blackboard no later than 11:59 p.m. PT on Monday, 6/19</td>
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<td>Week 6</td>
<td>6/19</td>
<td>introduce the Android SDK along with Android Studio</td>
<td>Submit your sample for assignment 3 on Blackboard no later than 11:59 p.m. PT on Monday, 6/26</td>
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| Week 7 | 6/26 | Esri ArcGIS Online and Mobile GIS  
Introducing contemporary SDK for developing mobile GIS applications, including Esri ArcGIS Runtime SDK. | 1) Announce your sample ownership for assignment 4, 2) submit project proposal, and 3) submit the full assignment 3 on Blackboard no later than 11:59 p.m. PT on Monday, 7/3 |
| Week 8 | 7/3*  
*Tuesday, 7/4 is university holiday | | Submit your sample for assignment 4 on Blackboard no later than 11:59 p.m. PT on Monday, 7/10 |
| Week 9 | 7/10 | Evolution of Mobile GIS  
A discussion of mobile GIS past, present, and future from the viewpoints of academia research | 1) Submit assignment 5 (part 1), 2) full assignment 4, and 3) first project update on Blackboard no later than 11:59 p.m. PT on Monday, 7/17 |
| Week 10 | 7/17 | Evolution of Mobile GIS (Cont’d)  
A discussion of mobile GIS past, present, and future in the industry | Submit the second project update on Blackboard no later than 11:59 p.m. PT on Monday, 7/24 |
| Week 11 | 7/24 | Contemporary Mobile GIS  
A discussion of contemporary mobile GIS software, hardware, and cloud platform | Submit the third project update on Blackboard no later than 11:59 p.m. PT on Monday, 7/31 |
| Week 12 | 7/31 | | Submit 1) fourth project update, 2) assignment 5 (part 2), and 3) presentation slides on Blackboard no later than 11:59 p.m. PT on Monday, 8/7 |
| Week 13 | 8/7*  
*Friday, 8/11 is the last day | Final Presentations  
Students will present their projects, summarizing the insights garnered from each phase of the project developing process. | Students present their projects and answer questions from audience. Allow 10 minutes per student assuming a maximum of 15 students per class  
**Final reports** to be submitted on Blackboard no later than 11:59 p.m. on Friday, 8/11 |
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://policy.usc.edu/student/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.

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 Relationship and Sexual Violence Prevention Services http://engemannshc.usc.edu/rsvp/ 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/academicalsupport/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.

Resources for Online Students

The Course Blackboard page and the GIST Community Blackboard page have many resources available for distance students enrolled in our graduate programs. In addition, all registered students can access electronic library resources through the link https://libraries.usc.edu/. Also, the USC Libraries have many important resources available for distance students through the link: https://libraries.usc.edu/faculty-students/distance-learners. This includes instructional videos, remote access to university resources, and other key contact information for distance students.