SSCI 592, Mobile GIS

Syllabus

Units: 4

Term — Day — Time: Spring 2018, Online

Location: Online

Instructor: Ran Tao, PhD
Office: AHF B57E
Regular Office Hours: Mon 3-4 pm and Wed 3-4 pm Pacific Time. Also available by appointment via email.

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Library Help: Andy Rutkowski
Office: VKC 36B
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Contact Info: arutkows@usc.edu, 213-740-6390 (office)

IT Help: Richard Tsung
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Course Scope and Purpose

Mobile GIS combines the latest technologies of Geographic Information Systems (GIS) and mobile devices. It enables us to collect, store, update, manipulate, analyze, and display geospatial data and information wherever and whenever we are. With the wide adoption of mobile devices and location-based services, mobile GIS plays a much more important role in people's daily life, business solution, policy making, and many more. In other words, mobile GIS is becoming ubiquitous.

This course is designed to immerse you in the fundamental programming concepts and cutting-edge technologies that support mobile GIS development. The course aims to provide students with the knowledge and skills necessary to successfully design and develop an interesting, useful, and easy-to-use mobile GIS application that can be shared to benefit the targeted community of users. The focus is on understanding the related concepts as well as applying the techniques to real practices.

This is an elective course for the M.S. GIST Program as well as the GIST, Geospatial Intelligence, and the Geospatial Leadership Certificate Programs.

Learning Outcomes

On completion of this course, students will 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.

Course Structure

The course will be taught as an online class. The learning and teaching strategies are student-centered. They aim to encourage a deep-learning approach by using reflection and self-evaluation. A significant part of this course is hands-on exercise. Guides and instruction will be provided to walk the student through a series of exercises, which cover all the most important aspects of Mobile GIS. In the last few weeks, all students should be confident to apply what

they have learned from the lectures and exercises to develop an interesting and useful mobile GIS application as the final project product.

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

For this course, every student is required to have an Android device. It is important to double check that your Android device has the latest operating system (Android 7.0 or above), a GPS sensor, Wi-Fi support. All course assignments including the final project will be completed using this Android device. We do not provide additional tech support for your devices.

In addition to the Android device, every student must have a computer (PC or Mac) with a fast Internet connection and a functional webcam for use whenever a presentation or meeting is scheduled.

SSI *Server and Tech Support* – This course utilizes the SSI Server which is a virtual desktop giving access to many different professional software. If you are unable to connect to the server or experience any type of technical issues, send an email using your USC account to SSI Tech Support at spatial_support@usc.edu, making sure to copy (cc) me on the email.

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. The technologies we will explore in this course 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 Discussion forum whenever you find something new and interesting.

Discussions forums 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 publicly 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

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 CartoDB.com). 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. As a result, you will become comfortable using the web to clarify concepts and terms that come up in the course when you do not understand them.

Supplementary readings will be assigned from various sources including:

- Fu, P., & Sun, J. (2010). *Web GIS: Principles and Applications*. Redlands, CA, Esri Press
- Tsou, M. H. (2004). Integrated Mobile GIS and Wireless Internet Map Servers for Environmental Monitoring and Management. C*artography and Geographic Information Science*, 31(3), 153-165.
- Sawada, M., Ploeger, K., Elsabbagh, A., Nastev, M., Saatcioglu, M., & Rosetti, E. (2014). *Integrated Desktop/Mobile GIS Application for Building Inventory*. Geological Survey of Canada, Open File, 7345.

Description and Assessment of Assignments

There are several different kinds of assignments with at least one due weekly. These are described in the Weekly Folders on Blackboard. Due dates are shown in the summary that follows.

Resume Assignment (1 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 SSI 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.

Major Assignments (5 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 (2 for a total of 10 points). You will take two quizzes on the Blackboard to test your understanding of object-oriented programming and Android.

Final Project (1 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 a video that demonstrates the results of your final project work.

The grades for the final project spread across four components as follows:

Proposal (8 points). Describes the proposed project, including software to be implemented and any data to be acquired.

Weekly updates (4 for a total of 8 points). To be posted to the discussion board.

Final report (12 points). Documents 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.

Demo video (10 points). A video with voiceover of a demonstration of your mobile GIS application and its capabilities.

Grading Breakdown

Assessment	Number	Points Each	Total Points
Resume Assignment	1	2	2
Major Assignments	5	10	50
Quizzes	2	5	10
Final Project (38 points in total)			
Proposal	1	8	8
Weekly Updates	4	2	8
Presentation	1	10	10
Final Report	1	12	12
Total	15	-	100

Assignment Submission Policy

Unless otherwise noted, assignments must be submitted via Blackboard by the due dates specified in the Course Schedule below and on the assignment instructions.

Unless otherwise noted, all Reading Assignments and Tutorials are *due by 11:59 pm Pacific Time (PT) on the due date*. 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 FOUR days late. No points will be given for submissions more than FOUR 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 PT on the last day of classes, except for the final report conducted during the final examination period.

Schedule

	Topic	Readings and Assignments	Deliverables/Due Dates
Week 1 1/8	**Introduction to Java and Android**	Class notes Resume Assignment Assignment 1	No deliverables
Week 2 1/16* *Monday, 1/15 is university holiday			
Week 3 1/22	**Object-Oriented Design, Programming and Mobile Fundamentals (Esri AppStudio)**	Class notes Fu, P., & Sun, J: Ch 5 Tsou, M. H. (2004). Chapter 5) Assignment 2	Resume Assignment: Monday 1/22 Assignment 1: Monday 1/29 Java Quiz: Monday 1/29
Week 4 1/29			
Week 5 2/5	**Android SDK and Android Studio**	Class notes Sawada et al. (2014) Assignment 3	Assignment 2: Monday 2/5
Week 6 2/12			Android Quiz: Monday, 2/12
Week 7 2/20* *Monday, 2/19 is university holiday	**Esri ArcGIS Online and Mobile GIS Introducing**	Class notes Final project descriptions Assignment 4	Assignment 3: Tuesday 2/20
Week 8 2/26			Final project proposal: Monday, 2/26
Week 9 3/5	**Evolution of Mobile GIS**	One self-selected GIS journal article and the class discussion board Assignment 5	Assignment 4: Monday 3/5
3/12*	*Spring Recess*		

*3/12-3/19 is Spring Recess			
Week 10 3/19	**Evolution of Mobile GIS (cont'd)**	A discussion of mobile GIS past, present, and future in the industry	Assignment 5 (Part 1): Monday 3/19
Week 11 3/26	**Contemporary Mobile GIS**	Class notes	Final project update 1: Monday 3/26
Week 12 4/2			Final project update 2: Monday 4/2
Week 13 4/9	**Final Project Development**	Project updates from fellow classmate and the class discussion board	Final project update 3: Monday 4/9 Assignment 5 (Part 2): Monday 4/9
Week 14 4/16	**Final Project Development (cont'd)**	Project updates from fellow classmate and the class discussion board	Final project update 4: Monday 4/16
Week 15 4/23* *Friday, 4/27 is the last day of class	**Final Presentations**	Class discussion board Project wrap-up notes Presentation slides	Project presentation and slides: 4/23-25
Final Examination	**Final Reports**	Presentation videos	Final reports: Friday, 5/4

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

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.