

Syllabus: GEOG650 - Mobile GIS - Fall 2015

Instructor

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Office Hours: On-campus: Wednesdays, 3 to 5 pm (Also available most days by appointment)

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Teaching Assistant

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About the Course

Time: 5:30 to 8 pm Mondays (Lectures); 5:30 to 7:30 pm Tuesdays (Labs)

Location: Online: <http://elms.umd.edu>; Campus Location: 1171 LeFrak Hall (Lectures)

Description

The emergence of highly-capable mobile devices and apps has opened new opportunity for location-based services. Apps enable us to collect and analyze data wherever and whenever we are. Mobile apps are generally classified into web apps and native apps. This course covers how to develop, test, and publish mobile GIS web and native apps across multiple mobile platforms (Android, iOS, etc.). This course uses the jQuery Mobile framework to create visually rich, interactive mobile web apps and the PhoneGap framework to compile web apps to native mobile apps running on Android, iOS, etc. This course also leverages the capabilities of JavaScript, HTML5, CSS3, jQuery Mobile, and PhoneGap with ArcGIS JavaScript API, Google Maps API, and Leaflet API to developing and publishing mobile GIS apps.

The specific objectives of this course are the followings:

- Understand mobile application development and deployment process.
- Understand jQuery and jQuery Mobile architecture.
- Build mobile web apps using HTML5, JavaScript, CSS3 and jQuery Mobile.
- Understand the difference between browser-based JavaScript and PhoneGap JavaScript.
- Build mobile web maps with ArcGIS Online Mobile, Google Maps, and Leaflet.
- Develop mobile web GIS apps with ArcGIS JavaScript and jQuery Mobile.
- Develop mobile native GIS apps using JavaScript and PhoneGap Build.

The format of this course will consist of lectures, lab assignments, and a final project. The lectures will be presented online via the Live Classroom on the Enterprise Learning Management System (ELMS). All lectures involve the interaction between students and instructor in real-time. Lectures will be archived into videos which will be made available on ELMS. Please note that video archives are only intended for occasional or backup use in case students have to miss lectures due to personal, business, or medical reasons. Real-time, online participation is strongly recommended.

Prerequisites

Students are expected to have experiences in web page development using HTML (HTML5), CSS (CSS3), and JavaScript, and PHP. Web Programming (GEOG657) is a prerequisite. Programming and Scripting (GEOG656) is recommended. Internet GIS (GEOG677) would be helpful.

Textbooks (Recommended, Not Required)

- jQuery Mobile: Up and Running, Maximiliano Firtman (MF), 2012, O'Reilly
- PhoneGap Essentials, John M. Wargo (JW), 2012, Addison-Wesley
- jQuery in Action, 2nd Edition, Bear Bibeault and Yehuda Katz, 2010, Manning Publications

Other Useful References

- W3Schools HTML5 tutorial, <http://www.w3schools.com/html/>
- W3Schools JavaScript tutorial, <http://www.w3schools.com/js/>
- W3Schools CSS3 tutorial, <http://www.w3schools.com/css/>
- W3Schools SVG (Scalable Vector Graphics) tutorial, <http://www.w3schools.com/svg/>
- W3Schools jQuery tutorial, <http://www.w3schools.com/jquery/>
- W3Schools JSON tutorial, <http://www.w3schools.com/json/>
- GeoJSON Format Specification, <http://geojson.org/>
- jQuery, <http://jquery.com/>
- jQuery Mobile, <http://jquerymobile.com/>
- ArcGIS Web App Resource Center, <http://resources.arcgis.com/en/communities/web/>
- ArcGIS JavaScript API, <https://developers.arcgis.com/javascript/>
- Google Maps API, <https://developers.google.com/maps/>
- YouTube Data API, <https://developers.google.com/youtube/>
- Flickr API, <http://www.flickr.com/services/api/>
- Leaflet API, <http://leafletjs.com/>
- PhoneGap, <http://phonegap.com/>
- PhoneGap Build, <https://build.phonegap.com/>
- Android Developer, <http://developer.android.com/>
- iOS Dev Center, <https://developer.apple.com/ios/>

Assignments

There are a total of seven (7) lab assignments and each will count towards 10% of the final grade. The due date will be specified in the lab document. Late submission of lab reports may result in a deduction of points. However, in some situations (e.g. medical or family emergency), extension is possible if you contact the instructor before the due date.

Final Project

A final project is required to complete this course. It will provide students an opportunity to design a mobile app that is closely related to their interests, field of study, research, or work. The project must be carried out individually and independently.

The final project consists of following parts: (1) a proposal; (2) an app; (3) a report; and (4) some online discussion. The proposal of your project must be two pages (single space). The proposal should: (1) identify the research problem or topic; (2) provide background information; (3) describe the data to be used; and (4) describe the proposed app. Specific guidelines will be provided later on. Students are encouraged to contact the instructor early during the semester to discuss potential topics and scope.

Grading

It is strongly encouraged to attend each lecture and actively participate in online discussion board as well as in class. Students are required to post a reply on the issue posted by the instructor. Lab assignments will be given on a weekly basis to help students gain practical experience in developing mobile apps. Students need to complete final projects to design and implement either a mobile web app or native app by using HTML5, JavaScript on jQuery Mobile, or the PhoneGap Build framework.

Final grades will be determined by the following items:

Lab Assignments = 70%

Final Project = 25%

Participation and Discussion = 5%

The plus/minus grading system will be used to assign student grades. Minor adjustments to this scale might be made based on the performance of the class as a whole.

Hardware and Software

- JQuery library (ver. 1.11.3), <http://jquery.com/download/>, <http://code.jquery.com/jquery-1.11.3.js>
- JQuery Mobile library (ver. 1.4.5), <http://code.jquery.com/mobile/1.4.5/jquery.mobile-1.4.5.js>
- Aptana Studio 3, <http://www.aptana.com/products/studio3/download> (free HTML text editor)
- Apache Web Server, <http://terpconnect.umd.edu> (web server for UMD students)
- FTP software, WinSCP (Secure FTP) for PC and Fetch for Mac, both of these are free downloads from <http://helpdesk.umd.edu> - scroll down and choose "FreOIT Provided Software Downloads" (If you choose to use a different FTP software, it must be capable of SFTP [secure uploads])

All students must have a UMD TerpConnect account to obtain permissions to upload HTML, JavaScript, and CSS files to your personal account in <http://terpconnect.umd.edu>. A smartphone or tablet PC is NOT a requirement, although it would be better if you have one. iOS simulator and Android emulator are used to develop and test mobile apps. When you deploy native apps to App Store and Android Apps Market after completing native app development you need to use a smartphone or tablet (iPad or Galaxy tab). You can borrow an Android phone from the department and use it on campus if you don't have one.

Communication and Support

Email

Both the TA and the instructor will always be available by email. Use the email link in the sidebar to send us an email at any time. We will try to answer within 24 hours and usually sooner.

Offline and Online Office Hours

I will be available to meet on campus for face-to-face office hours at specified times. You can also email either the TA or the instructor to set up individual office hours by appointment.

If needed, I can provide online office hours if you are unable to meet on campus. To do so, simply send me an e-mail to request a time to meet online.

Discussion Board

The discussion board is a place on the ELMS site for you to visit your classmates. This is an open forum for discussion about course material and for casual conversation. We encourage any general questions about the course material or lab assignments to be posted here so that students can help learn from each other. We will try to help answer any course-related questions that are posted here. In addition, there will be study rooms set up for you to form study groups. We will not be monitoring these rooms. Remember that the University Code of Academic Integrity specifies that you are free to work together and to discuss the assignments, but that you must produce your own original and independent work.

Class Attendance and Environment

You are strongly recommended to attend every lecture in real time at the online site. We will meet online at the announced time for a live audio/video lecture. During this time you can follow along with the lecture and ask any questions that you may have. The lecture will be archived for anyone who absolutely must miss a class, but I encourage you to join the class online at the appointed time so that you can ask questions and keep up with the course schedule.

In this class, students will meet in a virtual space online which will be treated as a classroom. Our class will meet within the Enterprise Learning Management System (ELMS), the university's online learning

system. Go to <http://elms.umd.edu> to access the course. After login, the course will be listed in the right column under "My Courses".

It is important to recognize that the classroom is an environment that requires respect for all participants. Therefore, students are expected to conduct themselves in a considerate manner.

Disabilities and Religion

Any student with a disability is encouraged to meet with the instructor privately during the first week of class to discuss accommodations. I will make every effort to accommodate students who are registered with the Disability Support Services (DSS) Office and provide a DSS accommodation form.

Please refer to the Online Undergraduate Catalog Policy on Religious Observance.

Academic Integrity

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets the standards for academic integrity at Maryland for all undergraduate and graduate students. As a student, you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.shc.umd.edu>.

Within our class, students may work together to review class notes and lab assignments. However, labs must be done individually. Students must turn in their own work without assistance from another student.

Course Schedule

This is a tentative schedule and may be adjusted. Changes will be announced and posted on ELMS.

Week	Date	Lecture Topics	Readings	Assignments
1	Aug. 31	Mobile Solutions; ESRI Mobile Solutions Mobile App Development Approaches HTML5 Geolocation; Creating a Mobile App	MF: 1 W3: HTML5	
2	Sept. 8 *	Introduction to jQuery Mobile jQuery Mobile Components	MF: 2, 3, 4	Lab 1 Out
3	Sept. 14	jQuery Mobile Event Handling jQuery Mobile Configuration Dynamic Content; AJAX and JSON	MF: 5, 6 W3: JSON	Lab 1 Due Lab 2 Out
4	Sept. 21	jQuery Mobile Methods and Properties Third-party APIs; Flickr API; YouTube API Theme Tools; Bootstrap and Ratchet	Various APIs	Lab 2 Due Lab 3 Out
5	Sept. 28	jQuery Mobile Map JavaScript APIs Google Maps API; ArcGIS API; Leaflet API Geographic Content; GeoJSON	Various APIs	Lab 3 Due Lab 4 Out Proposal Out
6	Oct. 5	Web Services and REST jQuery Mobile Themes; ThemeRoller CSS3 Overview	MF: 5, 6, 7	Lab 4 Due Lab 5 Out
7	Oct. 12	jQuery Mobile Form Components Processing Form Data in PHP PHP and MySQL; PhpMyAdmin	W3: 8 PHP	Lab 5 Due Lab 6 Out
8	Oct. 19	Introduction to PhoneGap Android and iOS Development Creating a PhoneGap Build App	JW: 1, 2, 3, 6, 10	Lab 6 Due Lab 7 Out Proposal Due
9	Oct. 26	PhoneGap APIs - Geolocation, Camera, Device, Events, Connectivity, Storage Offline Access using App Cache	JW: 11, 12, 13, 16, 17	Lab 7 Due
10	Nov. 2	PhoneGap APIs - Compass, Accelerometer, Notification, Contact Review and Q&A	JW: 18, 20, 21, 22	Project due *

* Lecture for Week 2 will meet on Tuesday to honor Labor Day on Monday.

* Project discussion will be online during the last week of class. Final Projects will be due before Nov. 6.

Lab Assignment Topics

Lab 1 - Creating a Mobile-friendly Web App

Lab 2 - Changing the Contents of an App Dynamically

Lab 3 - Getting the Current Location using Geolocation

Lab 4 - Finding Services and Directions using Google Maps

Lab 5 - Implementing Flickr and YouTube APIs

Lab 6 - Adding Database Capabilities to a Web App

Lab 7 - Designing a Hybrid App with PhoneGap Build