GEOG650
Mobile GIS - Fall 2017

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Online office hours : Mondays 8– 9pm
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Lecture: Mondays 5:30 - 8:00pm
            Online & On-campus LeFrak 1166
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Description

The emergence of highly-capable mobile devices and applications has opened new opportunity for location-based services. Mobile apps enable us to collect and analyze data wherever and whenever we are. Mobile apps are generally classified into web apps, hybrid apps, and native apps. This course covers how to develop, test, and publish mobile GIS web apps and hybrid apps working across multiple mobile platforms (Android, iOS, etc.). This course uses HTML5, CSS3, JavaScript, Angular JS, Ionic, and Apache Cordova to develop hybrid mobile apps. This course also leverages the capabilities of mobile devices using Apache Cordova and develop mobile map apps using Google Map JavaScript library.

The specific objectives of this course are the followings:
- Understand mobile application development and deployment process.
- Build mobile web apps using HTML5, JavaScript, CSS3, Agular JS and Ionic.
- Understand PhoneGap Build, PhoneGap, and Apache Cordova.
- Build mobile native apps using HTML5, JavaScript, CSS3, Agular JS, Ionic and PhoneGap Build
- Develop mobile web GIS apps with Google Map JavaScript library and Apache Cordova

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 HTML5, CSS3, and JavaScript, and PHP. Geog657 (Web Programming) is prerequisite and GEO656 (Programming and Scripting for GIS) is recommended.

Reference Textbooks

***Ionic : Hybrid Mobile App Development, Rahat Khanna Sani Yusuf and Hoc Phan, 2017, Packt Publishing, 1ˢᵗ Edition, Getting Started with Ionic, Rahat Khanna, 2016, Packt Publishing,
1ˢᵗ Edition, https://umaryland.on.worldcat.org/oclc/935639204 (Links to an external site.)
Ionic Framework By Example, Sani Yusuf, Packt Publishing,
1ˢᵗ Edition, https://umaryland.on.worldcat.org/oclc/968128697 (Links to an external site.)
Ionic 2 Cookbook, Hoc Phan, 2016, Packt Publishing,
2ⁿᵈ Edition, https://umaryland.on.worldcat.org/oclc/965716154 (Links to an external site.)
*PhoneGap: Beginner's Guide, Purusothaman Ramanujam & Giorgio Natili, 2015, Packt Publishing, 3rd Edition, https://umaryland.on.worldcat.org/oclc/918863939**

Mobile App Development with Ionic 2: Cross-Platform Apps with Ionic, Angular, and Cordova, Chris Griffith, 2017, O'Reilly Media, 1st Edition
Apache Cordova in Action, 2015, Raymond K. Camden, Manning Publications, 1st Edition
 * Ones recommended to most

Other Useful References
W3Schools online web tutorial, http://www.w3schools.com/
W3Schools HTML5 tutorial, http://www.w3schools.com/html5/default.asp
W3 Schools CSS3 tutorial, http://www.w3schools.com/css3/default.asp
W3 Schools JavaScript tutorial, http://www.w3schools.com/js/default.asp
W3 Schools jQuery tutorial, https://www.w3schools.com/jquery/
PhoneGap, http://phonegap.com/
Ionic, https://ionicframework.com/
Angular, https://angular.io/
NodeJS, https://nodejs.org/en/
Android Developer, http://developer.android.com/
iOS Dev Center, https://developer.apple.com/devcenter/ios/index.action
Google Maps JavaScript API, https://developers.google.com/maps/documentation/javascript/
App Studio for ArcGIS, http://appstudio.arcgis.com/

Course Requirements and 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 websites. Students need to complete final projects to design and implement dynamic websites using PHP and Database Server (MySQL). Final grades will be determined by the following items:

- Weekly discussions and participation   5 %
- Weekly Review Quizzes   5 %
- Lab assignments   65 %
- Final Project   25 %
- Final project

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.

      97-100 = A+
      94-96.99 = A
      90-93.99 = A-
      87-89.99 = B+
      84-86.99 = B
      80-83.99 = B-
      77-79.99 = C+
      74-76.99 = C
      70-73.99 = C-
      67-69.99 = D+
      64-66.99 = D
      60-63.99 = D-

<60 = F

Assignments

There are a total of six (6) lab assignments. 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 and implement 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) an outline; (2) a proposal; (3) an app; (4) a report; and (5) some online discussion. The proposal of your project must be two pages (single space). The proposal should: (1) identify the design topic; (2) provide background information; (3) describe the data to be used or collected; and (4) describe the proposed app structure.

Software Requirements for Web Programming

- NodeJS (https://nodejs.org/en/)
- Cordova   (http://cordova.apache.org/#getstarted)
- Ionic (http://ionicframework.com/getting-started/)
- PhoneGap Desktop App (http://docs.phonegap.com/references/desktop-app/)
- PhoneGap Developer Mobile App (http://docs.phonegap.com/getting-started/2-install-mobile-app/)
- WAMP Server (http://www.wampserver.com). WAMP Server is a free all-in-on package to install all of Apache Web Server, PHP, and MySQL in once on Windows.
- MAMP (http://www.mamp.info/en/downloads/). MAMP Server is a free all-in-on package to install all of Apache Web Server, PHP, and MySQL in once on Mac OS X.
- Aptana Studio 3 (http://www.aptana.com/products/studio3/download), Aptana Studio is a free text editor for Web app development
- Visual Studio Code (https://code.visualstudio.com/), Visual Studio Code is a free text editor used for Web and Hybrid (Cordova and Ionic) app development
- FTP software: we recommend WinSCP (Secure FTP) for PC and Fetch for Mac. Both of these are free downloads from http://terpware.umd.edu/

All students must have a UMD TerpConnect (used to be Glue) account to obtain permissions to upload HTML and CSS files to your personal account in http://terpconnect.umd.edu. Students will be able to use Aptana Studio, Apache, PHP, and MySQLavailable in the remote THEMIS server (129.2.24.54). All assignments should be saved in your personal directory in the remote Web server and run on the server. Details about the web server will provided in the class and posted in the Announcements.

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	Assignments
1	Aug. 27	Introduction to Mobile GIS Mobile App Development Approaches ESRI Mobile Solutions	Outline Out
2	Sept. 4 *	Introduction to PhoneGap – PhoneGap Desktop and CLI Creating PhoneGap Apps Configuring PhoneGap Apps	Outline Due
3	Sept. 10	PhoneGap Ecosystem Cordova Plugin & API Cordova Events	Lab 1 Out
4	Sept. 17	Review of JavaScript Mobile Apps with Map APIs Cordova Plugin APIs	Lab 1 Due Lab 2 Out
5	Sept. 24	HTML Form Review AJAX, JSON, PHP Overview Cordova with AJAX and PHP	Lab 2 Due Lab 3 Out Proposal Out
6	Oct. 1	Introduction to Ionic – Ionic Framework, Installation, Creating an Ionic Project TypeScript Overview Angular 2 Overview Ionic Components	Lab 3 Due Lab 4 Out
7	Oct. 8	No Lecture - Independent Study	
8	Oct. 15	GeoJSON Overview More on Google Maps API Ionic Lifecycle Events Ionic Data Binding	Lab 4 Due Lab 5 Out Proposal Due
9	Oct. 22	Ionic Form Components Ionic Form Handling Processing Form Data in PHP More on Ionic UI Components Ionic Directives	Lab 5 Due Lab 6 Out
10	Oct. 29	RESTful Web Services Third-party JavaScript API	Lab 6 Due
11	Nov. 5	Native Mobile Environments Publishing an Ionic App Ionic Native Ionic Storage	
12	Nov. 12	No Lecture - Independent Work on Project	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. 14.