Mobile Application Development: Advanced Topics
ATLS 4320 Spring 2020

Class:
TR 9:00-10:50
ATLS 104

Instructor:
Isaac Sheets
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Office Hours:
TBD

Course Description
In Mobile Application Development: Advanced Topics students will gain in-depth understanding of the mobile platform and the intricacies of mobile interaction design. Students will create engaging and sophisticated apps on the iOS and Android platforms and join the growing app developer community. The class will feature a combination of lectures, demonstrations, guest speakers and open lab sessions. Selected research, tutorials, and related readings will contribute to class discussions and projects.

Objectives
At the end of this course, students will have the knowledge and experience needed to create robust mobile apps that leverage the IT infrastructure. Students will gain these skills by meeting the following objectives:

- Proficiency in developing iOS and Android apps using multiple navigation models
- Understanding of various data flow and storage models, both local and in the cloud
- Ability to leverage libraries, programming interfaces, and data from various sources
- In-depth understanding of the iOS and Android platforms
- Advanced concepts in Swift and Kotlin

Pre-requisites
ATLS 4120 Mobile Application Development or an equivalent course is a required prerequisite. Knowledge of basic iOS and Android development is necessary for this course. For students that have not taken the course listed above, please come speak with me.

Required Texts
Beginning iPhone Development with Swift 5: Exploring the iOS SDK 5th edition by Wallace Wang. Apress, 2019. Available at the CU bookstore or online for purchase or download the PDF version through the CU library https://libraries.colorado.edu/record=b10710200~S3 or Springer https://link-springer-com.colorado.idm.oclc.org/book/10.1007%2F978-1-4842-4865-2 (must be on CU network).

Swift 5 for Absolute Beginners 5th edition by Stefan Kaczmarek, Brad Lees, Gary Bennett. Apress 2019. PDF version available through the CU library http://libraries.colorado.edu/record=b10723557~S3 or Springer https://link-springer-com.colorado.idm.oclc.org/book/10.1007%2F978-1-4842-4868-3 (must be on CU network).

The Swift Programming Language(Swift 5.1 Edition) available in Apple's Developer Library https://docs.swift.org/swift-book/index.html and in the iBooks store for free.

Required Materials
iOS development: Xcode 11.3, Swift 5.1, iOS 12 or higher mobile device, a Mac machine running macOS 10.13.6 High Sierra or later.

Android development: Android Studio 3.5 on Windows 7/8/10, macOS 10.10 Yosemite up to 10.14 Mojave, Linux GNOME or KDE desktop. More details/options here

Xcode and Android Studio are on all lab Macs in the ATLAS building for your use. Additionally, Xcode is on the Macs in Norlin as well. If you are using a lab Mac you will need a portable storage device such as a USB Jump Drive to save your apps. The workspace on the lab Macs may be wiped at any time during the semester. Lost and/or corrupted work is not an acceptable excuse for late work.

Class Resources

All class information is available on Canvas at https://canvas.colorado.edu/courses/58760. This includes the class schedule, assignments, and resources. It is your responsibility to check Canvas regularly to keep up with the class and complete all assignments. All class examples are available on GitHub: https://github.com/isheets/Spring20_Adv_MAD_examples

Topical Outline

We will be exploring mobile app design and development, including the various technologies and concepts needed to develop for the iOS and Android platforms. These include, but are not limited to:

- Navigation models
    - Navigation architecture for multiple view apps
    - Data modeling and flow
- Data persistence
    - local/client
    - server/cloud
- Leveraging external libraries
- Accessibility
- Utilizing application programming interfaces (APIs)
    - Custom and provided content providers
    - Integrate data from outside sources
- Background processes
    - Foreground/background
    - Processes/Threads

Workload

This course is technical and challenging and requires a great deal of time and commitment outside of our scheduled meeting times. Students should plan on spending 2-3 hours of outside class time for every hour in class. For this class, that translates to 8-12 hours per week of work outside of class. Please let me know if you have any concerns about this time commitment or if you feel like you are struggling at any point!

Attendance

This is a fast-paced course with new topics covered every class and each new concept building on top of previous ones. Attendance and class participation are important components of the course. You are encouraged to ask relevant questions, share your thoughts, and work with fellow students. You are

expected to the entirety of your time in class working on class-related projects. Class time should not be used for any other classes or activities.

As unavoidable circumstances might occur, 3 absences are allowed during the semester. Every additional class missed causes a 10% reduction in a student's final grade. Extreme lateness counts as 1/3 of an absence. You are responsible for all material and announcements made in class. Do not expect me to catch you up for classes you've missed -- that's your responsibility. Critique days are required; an absence that day will impact your grade for that project.

In extreme situations such as major illnesses, death in the family (or close friends), religious observances (see below), or school related absences, please talk, email me, or message me on Slack before your absence.

Grading

Grades will be posted on Canvas: https://canvas.colorado.edu/courses/58760

Grading in this course is based on the following components:

- Projects 50%
- Quizzes 10%
- Labs 40%

Grading Criteria

The grading standard used in ATLAS courses is as follows:

A: excellent work – far beyond minimal requirements
B: above average work – went beyond minimal requirements
C: average/competent work – met the minimal requirements
D: below average work – did not meet the minimal requirements
F: unsatisfactory work

Grading Rubric

Labs are graded based on their completeness (meets the assignment's requirements), timeliness (turned in on time), and technical proficiency (works correctly).

Projects are graded based on their concept, design and aesthetics, and technical execution.

Late work

All assignments are due on GitHub at the start of class on their due date. Please make sure your assignments are clearly labeled so they are easy for me to identify. Late projects will be penalized 10% per 24-hour period that it's late.

In case of an emergency, students must notify me via email or Slack if you will miss an assignment deadline before the due date to discuss special arrangements.

Code Plagiarism

I encourage students to work together on assignments, but I expect the work turned in to be each student's own. So work together, talk, brainstorm, trouble shoot, but make sure that the assignments you turn in were created by you. If you do work with another student on an assignment, please make sure that you include this information either in the submission comments or in the header comments of your code!

The web is a great resource, and searching for help, answers, and inspiration is very useful, so take advantage of it. You can adapt the ideas and concepts you find online to be part of your work, but your code must be written entirely by you, and you should be able to explain all of the code you use in a project. If your project uses code snippets found from other sources they should not exceed 20% of your code and you should be able to explain how that code works. Turning in a project that doesn't meet this guideline will result in an F for the entire project. If you are using code snippets, or coding concepts, from other sources you must cite the sources in the comments section. Copying programs directly out of a book, web site, or from another person without properly citing them is considered plagiarism and will be dealt with in accordance with the CU Honor Code (see below). Please check with me if you are unclear on the line between adaptation and plagiarism. Also, reusing projects from another class or commercial work is not acceptable for projects in this course unless you get previous approval from me.

TAM Policies

Grades

93 - 100	A	77 - 79	C+
90 - 92	A-	73 - 76	C
87 - 89	B+	70 - 72	C-
83 - 36	B	60 - 69	D
80 - 82	B-	0 - 50	F

Notes on the grading criteria

Work will be evaluated according to the following criteria:

- Conceptual proficiency
- Design proficiency / Creativity
- Technical mastery of the skills

Assignments that satisfy all of the requirements given will earn you a B. This is good work, the type of work where you say *I really tried hard*. To earn an A you will present *extraordinary* work that is creative, thought-provoking, interesting, and, most importantly, work that goes above and beyond the requirements of the assignment.

Honor Code

Students are expected to be familiar with and abide by the University of Colorado Student Honor Code: http://honorcode.colorado.edu

Copyrighted Material
Unless a student is intentionally exploring the idea of remix and/or appropriation, students should avoid using copyrighted material in their creative work. Students should be encouraged to create their own media assets (imagery, sound, etc.).

"Double Dipping"
"Double Dipping" or submitting the same work (paper, project, etc.) for multiple classes is prohibited and is a violation of the CU Honor Code http://honorcode.colorado.edu. In extremely rare circumstances, this is allowable with consent and approval from both instructors and if the scope of the work is increased to reflect multiple courses.

Walk-in Tutoring
TAM courses typically require a large amount of work outside regularly scheduled class time, typically 2–3 hours of outside class for each hour spent in class per week. To help alleviate faculty workload, TAM provides walk-in tutoring hours where students can get their questions answered. Walk-in tutoring hours are posted at http://tam.colorado.edu/tutoring.html

Participation
Students need to be present in order to create, review, and discuss the work that is being produced. Therefore, individual attendance is essential to the dynamic of the class as a whole. We allow 3 "get out of school free" absences (not applicable to critique days), every absence after that will result in the lowering of the final letter grade by 5%. Tardiness (being late or skipping out early) counts as a .333 absence.

Individual projects that are turned in late will result in the grade being lowered for that project. Feedback through the form of critique is also essential; absence from any of the class critiques will result in a drop of one letter grade for that assignment.

Freedom of Speech
This class is held in an academic university setting and due to the inherent nature of the internet and broad range of topics that your project work will explore it is inevitable that we will come across issues dealing with politics and religion. My role during such discussions will be a facilitator, a mediator, and as impartial as humanly possible. All students are encouraged to participate in open discussion and academic discourse.

Course Content
The instructor of this class reserves the right to show a broad range of course materials, some of which assume the audience to be adult in age and demeanor. should a student feel offended by something they have seen or heard, it would be appreciated, but not required, to stay to be part of the dialogue to offer your perspective, however if the student feels that they cannot stay, they are welcome to leave the classroom as discreetly as possible.

Computers, Laptops and Mobile Computing Devices Usage Policy:
Laptops and mobile computing devices can be a great asset to learning, but they can also be a source of distraction and actually impair the learning environment. Within ATLAS courses, computers, laptops and mobile computing devices should only be used for class related activities. Checking E-mail, "Facebooking," working on assignments or projects for other courses, Instant Messaging, gaming and web-surfing are examples of unacceptable classroom behaviors. If you are found to be engaging in these activities during course time, Instructors reserve the right to ask you to leave the classroom.

Additionally, the use of a cell-phones or texting devices during class is forbidden.

University Policies

Accommodation for Disabilities
If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the Disability Services website. Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see Temporary Medical Conditions under the Students tab on the Disability Services website.

Classroom Behavior
Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the policies on classroom behavior and the Student Code of Conduct.

Preferred Student Names and Pronouns
CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

Honor Code
All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu); 303-492-5550). Students found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the Honor Code Office website.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation
The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, intimate partner abuse (including dating or domestic violence), stalking, or protected-class discrimination or harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or

cureport@colorado.edu. Information about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website.
Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. **Please notify me at the start of the semester if you anticipate any religious observance conflicts for this class**, as this will help me to accommodate them in the most efficient manner. See the campus policy regarding religious observances for full details.

By enrolling, and remaining enrolled in this class, you signify your awareness and understanding of the policies contained within this syllabus and your agreement to conduct yourself in accordance with these policies.