

CSE 394: Mobile Application Development
School of Computing, Informatics, and Decision Systems Eng.
Arizona State University

Catalog Description: Topics include mobile application principles including design patterns, data persistence, interfacing with services and devices, location and incorporation of existing frameworks, user interface and experience design, context awareness, utilization of built-in tools for software profiling, testing, and version control, and security/privacy issues.

Course Outcomes and Objectives: After completing this course, students should be able to

- Demonstrate the ability to apply special considerations for mobile app design and implementation in developing mobile apps
- Utilize frameworks present in mobile environments to accelerate development
- Construct location and user aware applications
- Develop apps that use user interactions and gestures
- Interface with hardware elements such as the camera and accelerometer.
- Use data storage sources within the device as well as outside the device
- Understand security and privacy considerations in mobile computing
- Develop bug-free high-performance code through testing and profiling
- Develop an app from conception to app-store publication

Prerequisites: CSE 240/CSE 220 C or better (or equivalent)

Major Topics Covered in the Course:

1. Application design considerations for mobile applications due to hardware/software limitations such as (focus on OS and underlying hardware)
 - a. Memory
 - b. Battery power
 - c. Display
2. Application design, implementation, and testing frameworks
3. Advanced Object-Oriented Programming
 - a. Mobile-Application Design Patterns (MVC)
 - b. Advanced data structures
 - c. Multi-threading
4. Data storage and data persistence (local and remote)
 - a. Database
 - b. Cloud integration
5. User interactions and gestures
6. Image manipulations and animations

7. Context and location awareness
8. Interfacing with peripherals; camera, audio, accelerometer and GPS
9. Interfacing with web services and using web data
10. Introduction to security and privacy issues in mobile computing

Assessment and Grading:

Homework/Projects - 55%

(Students can use either ios platform or android in completing assignment. However, class examples, lecture notes are based on ios. So, if a student choses to use android platform to complete assignments then the student has responsibility to learn required construct)

Quizzes - 10%

Midterm I - 10%

Midterm II – 10%

Final Exam - 15%

Text Book: Currently undergoing first revision and will announce as soon as available.

A majority of the relevant material for this course will come from online resources, API documentation, and notes written specially for this course. Some other resources worth using are:

[1] Apple API Reference -

<http://developer.apple.com/library/ios/#referencelibrary/GettingStarted/RoadMapiOS/chapters/Introduction.html>

[2] Apple WWDC(site/itunes)

<https://developer.apple.com/wwdc/videos/>

Topics and Lecture Hours Distribution-Tentative

Total Number of Weeks: 15

Topics:

1. Introduction to mobile computing – **1 Week**
 - Resource limitations
 - Input/output issues (touch/gestures)
 - UI design issues
2. Mobile app development frameworks and techniques – **2 Week**
 - Foundation Framework and X-Code
 - Storyboarding

- Memory Management : Automatic Reference Counting
 - Views, delegates, loading/saving
 - Introduction to MVC architecture
3. Advanced data structures and techniques– **1.5 Weeks**
- Blocks
 - Multi-threading
 - NSTimer and synchronous and asynchronous updates
4. User interactions and gestures - **1 Week**
- Common gestures (touch, swipe, pinch, shake)
 - Auto-sizing
5. Image manipulations and animations- **1 Week**
- Image manipulation and drawing in Quartz
 - Simple animations using blocks
6. Data storage and data persistence – **2 Weeks**
- Main bundle(iOS) / resources(Android) , read-only storage defined at compile-time
 - Serialization of objects using protocols
 - Local directories , read-write defined and used at run-time
 - Interfacing with Storage as a Service
7. Context aware and location awareness – **2 Week**
- Mapkit
 - Colocation framework
 - Geocoding
 - Accelerometer
 - GPS
8. Interfacing with web services and using web data- **1.5 Weeks**
- JSON, Web Requests and caching
 - Integrating with Cloud
9. Testing and Profiling - **1 Week**
- Profiling and Instruments
 - Unit testing frameworks

10. Interfacing with peripherals - **1 Week**

- Camera and Audio interfacing

11. Introduction to security and privacy issues in mobile computing - **1 Week**

- Risks and Attacks on Mobile Devices
- Introduction to architecting secure mobile apps