

**San José State University**  
**College of Science / Department of Computer Science**  
**CS 175 Mobile Device Development, Spring 2018**

**Course and Contact Information**

<b>Instructor:</b>	Dr. Angus Yeung
<b>Office Location:</b>	DH 282
<b>Email:</b>	fai.yeung@sjsu.edu
<b>Office Hours:</b>	Saturday 12:45 – 02:00 or by appointment
<b>Class Days/Time:</b>	Saturday 10:00 – 12:45
<b>Classroom:</b>	MH 422
<b>Prerequisites:</b>	CS 047, and knowledge of Java equivalent to that of CS 046A or CS 049J

**Faculty Web Page and MYSJSU Messaging**

*Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on [Canvas Learning Management System course login website](http://sjsu.instructure.com) at <http://sjsu.instructure.com>. You are responsible for regularly checking with the messaging system through [MySJSU](http://my.sjsu.edu) at <http://my.sjsu.edu> to learn of any updates. Please also use Piazza for class discussions including private messages to the instructors. Sign up link is [here](#).*

**Course Description**

Comprehensive introduction to building mobile applications for devices based on Android and iOS operating systems, including use of standard integrated development environment: Android Studio and Xcode, as well as testing and debugging on devices and emulators/simulators. Topics cover programming languages, Java for Android programming / Swift for iOS programming, and mobile platform APIs for user interface, graphics, networking, data and web services. Prerequisites are any college-level courses for modern and object-oriented programming languages such as Java.

**Course Learning Outcomes (CLO)**

Introduce students to the basic principles of mobile device development, plus elements required for developing Android and iOS mobile applications. Cover both object-oriented languages: Java / Kotlin and Swift, with the latter not yet seen in any other computer science classes offered in the department. Teach basic user interface programming with hardware features provided by a mobile device.

## Course Goals:

1. Understand the mobile software architecture and building blocks for Android and iOS;
2. Get familiar with the workflow and lifecycle of components for developing mobile applications;
3. Develop Model-View-Controller based app with simple user interface;
4. Work with mobile platform framework APIs for device sensors, graphics and location services;
5. Understand the messaging and threading model for user interface events;
6. Develop multi-threading, concurrent and background processing solutions for mobile applications;
7. Work with platform API for persistence storage, database and cloud storage;

## Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- Mobile Application Development
  - Understand the workflow for mobile app development
  - Design, implement, test and debug mobile applications with object-oriented languages
  - Use model-view-controller model for user interface programming
  - Implement user interface layout design and handle event messaging
  - Develop features using mobile device hardware features: touch, gesture, orientation, graphics, and location services
  - Implement client-side code to work with web services
- Android Development
  - Understand Android system architecture, runtime, manifest file
  - Understand essential app components: Activity, Service, Broadcast Receiver and Content Provider
  - Use Android Studio, Android SDK manager, debugging monitor, and emulator
- iOS Development
  - Develop iOS application using Swift programming language
  - Use Xcode, Interface Editor, View Controller, emulator and other tools

## Required Texts/Readings

### Textbook

T. Cornez and R. Cornez, *Android Programming Concepts*, Jones & Bartlett Learning, ISBN 1284070700  
*The Swift Programming Language (Swift 4)*, Apple Inc., Available on iBook Store

### Other Readings

D. Jemerov and S. Isakova, *Kotlin in Action*, 1<sup>st</sup> Ed. Manning Publications, ISBN 1617293296  
B. Phillips et al., *Android Programming: The Big Nerd Ranch Guide*, 2<sup>nd</sup> Ed.  
J. Annuzzi Jr. et al., *Advanced Android Application Development*, Addison-Wesley Professional, 4<sup>th</sup> ed.  
C. Keur and A. Hillegass, *iOS Programming: The Big Nerd Ranch Guide*, 6<sup>th</sup> Ed., ISBN 0134390733

## **Other technology requirements / equipment / material**

### **Android Mobile Development**

This course uses Android Studio as the main integrated development environment (IDE). Unless specified otherwise, all Android mobile development in this course shall target for Android SDK 4.4, also known as KitKat.

While the instructor mainly uses Mac OS X operating system in this course, students can use Windows or Linux operating systems for Android code development. Students are expected to configure the environment of their own computers, including the installation of Java Development Kits and the configuration for USB based debugging.

Newer Android hardware device (phone or tablet) is recommended but not required for this course. However, students using an Android device emulator alone will most likely expect sluggish performance and/or decreased productivity. Not all Android mobile platform APIs are supported in outdated Android hardware devices.

### **iOS Mobile Development**

In order to properly learn iOS mobile development, all students taking this course/section must use a computer with Mac OS X operating system or use hosted Mac computing services. This is because Xcode and tools for iOS development are available for Mac OS X operating system only. Xcode is the IDE (integrated development environment) for iOS mobile development.

Xcode 9.2 or later will be used in this course. All iOS applications will be developed using Swift 4.0 and iOS 11. You are not required to apply for an Apple Developer account (\$99 per year) in order to develop and test your iOS mobile app. However, you'll need a developer account if you want to publish your app to Apple's App Store (not required by this course).

An iOS 11 or above device (iPad, iPhone, etc.) is recommended but not required for this course. Without an iOS device, you'll still be able to develop your iOS app using iOS device emulator in Xcode.

## **Course Requirements and Assignments**

### **Required Readings**

Students are expected to go over required readings after each lecture. The required readings cover the required textbook chapters as well as supplementary learning material provided by the instructor. The end-of-chapter exercises (if available) are *optional* but some of the exercises may be included in homework assignments.

### **Assignments**

Homework assignment is an essential learning module for this course. There are a total of four assignments: two homework assignments consisting of written questions, and two programming assignments. The written questions could be essay questions, multiple choices, true or false, and fill-in-the-blank. The programming assignments require each student's individual effort to come up with coding solution to challenging programming questions.

All homework assignments including both written and programming assignments are submitted electronically. The guideline for submission will be available on Canvas. Students are required to submit the source code of their programming assignments to GitHub Classroom.

## Final Project

Students are expected to publish a fully functional mobile application for this course. Final Project can be either Android or iOS application. Take note that final project is individual based and it is NOT a group project. The assessment for final project is based on 1) business, technical, and quality requirements, and 2) in-class presentation of student's project. The requirements for final project are available on Canvas.

Students are allowed to include third-party libraries and sample code in the mobile application for final project but the links for original source code and license information must be fully disclosed and included in source code file(s) for final project submission.

## Exams

There will be one mid-term exam and one final exam during the class time for this course. The first mid-term exam covers Android mobile development while the final exam covers both Android and Swift/iOS mobile development. It is mandatory for the students to take both mid-term and final exams.

Exams cover all class material and concepts taught in this course. All questions in the exam are multiple choices and true or false. There won't be any programming questions in the exams.

Both mid-term exams will be available on the day of the exam and on Canvas. Students are expected to submit their answers electronically on Canvas.

## Grading Information

The class letter grades will be curved. The percentage weight assigned to class assignments, exams, and final project are listed as below:

Written Assignment #1 (Android)	5%
Written Assignment #2 (Android)	5%
Android Programming #1	15%
Android Programming #2	15%
Mid-term Exam (Android)	15%
Final Exam	25%
Final Project	20%
	<b>100%</b>

Late or missed work will not be accepted.

## University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

# CS 175 Mobile Device Development, Spring 2018, Course Schedule

*Schedule is subject to change with fair notice. Notice will be made available with Canvas notifications and announced in the class.*

Lecture	Date	Topics	Deadlines
1	01/27	Class introduction IDE, Source Code Repository DevOps, Workflow, Agile Process	
2	02/03	Android Basics, Android Architecture Hello World App App Components. Activity.	
3	02/10	Intents, Fragments. Layouts, Input and Output, Views, Adaptors	
4	02/17	Broadcast Receiver, Pending Intent, SMS Touch Gestures	HW #1
5	02/24	Multithreading, Concurrency, UI Thread. Local, Remote, and Global Remote Services.	
6	03/03	Sensors, Sensor Manager. Camera, Photo Editing, Location, Geocoder, Google Maps.	Programming #1
7	03/10	Networking, Web Services, REST, JSON. Android Storage, Database, Content Provider.	
8	03/17	Mid-term Exam	HW2
9	03/24	Swift Programming I	
	03/31	Spring Recess (No Class)	
10	04/07	Swift Programming II	Programming #2
11	04/14	Swift Programming: Closures, GCD	
12	04/21	iOS Programming Basics	
13	04/28	iOS Programming: Building a simple app	
14	05/05	iOS Programming: Building a complete app	
15	05/12	Final Project: Demos / Evaluation	Final Project
	05/19	Final Exam 10:00 am – 12:15 pm, MH422	