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Course Outline for CS 18

MOBILE APPLICATION DEVELOPMENT - ANDROID

Effective: Fall 2017

I. CATALOG DESCRIPTION:
CS 18 — MOBILE APPLICATION DEVELOPMENT - ANDROID — 3.00 units

This programming course is intended for those students who already have completed an introductory programming course and presents a comprehensive study of concepts and skills in Android programming and helps students develop applications for mobile devices. Students will use a software emulator to develop applications and a real mobile device to demonstrate applications. The focus is on Computer Science concepts needed to develop, debug, and test a variation of existing applications.

2.00 Units Lecture 1.00 Units Lab

Strongly Recommended
CS 31 - Java Programming
with a minimum grade of C

Grading Methods:
Letter or P/NP

Discipline:

	MIN
Lecture Hours:	36.00
Lab Hours:	54.00
Total Hours:	90.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering this course, it is strongly recommended that the student should be able to:

A. CS31
1. Explain and apply basic principles of software engineering.
2. Design and implement both command line and graphical user interfaces using Java built-in classes.
3. Design and implement both built-in and complex Java data types and variables.
4. Understand and implement Java multi-dimensional arrays and vectors.
5. Create java programs that implement standard data structures such as queues, linked lists, stacks, trees and hash tables.
6. Design and implement programs accessing network resources and client/server protocols.
7. Write, compile, test and debug java programs and applets using both command line and integrated development environments;
8. Design and implement event-driven programs;
9. Design and implement Java classes including inheritance within a class hierarchy.
10. Design and implement Java constructors and other methods within a class.

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

A. Design, Create and Debug applications using the Android Development environment for both Android based Smart-Phones and Tablet computers
B. Design and Create effective User Interfaces (UIs) using controls, layout managers, adapters, menus and dialogues
C. Implement Android applications incorporating activities, services, content providers and proadcast receivers
D. Describe in full the Android security mode allowing for secure applications on Android based computing devices
E. Implement telephony based applications in the Android Environment
F. Use the SQLLite engine for database storage of information created within an Android Application
G. Save, Load and manipulate files in an application developed for any Android based Device

V. CONTENT:
A. Overview of Android Applications
1. The Android Development Environment
2. Acquiring, Installing, Configuring the Development Environment
3. Use of Android resources including, but not limited to, Views, Activities, Intents, Services, Strings, Layouts, Assets and RAW

resources
4. Android Fundamental Components

B. Review of the Java Programming Language
C. Android Essentials
1. Structure of an Android Application
2. Android Application Life Cycle
3. Android Resources
4. Content Providers
5. Android Intents

D. Building User Interfaces (UIs)
1. User Interface Design Concepts
2. Controls
a. Text
b. Button
c. List
d. Grid
e. Date/Time
f. Map View
3. Layout Managers
a. Linear Layout
b. Table Layout
c. Relative Layout
d. Absolute Layout
e. Frame Layout
4. Adapters
a. Simple Cursor Adapter
b. Array Adapter
5. Menus
a. Expanded Menus
b. Loading Menus through XML files
6. Dialogues
a. Prompt Dialogue
b. Alert Dialogue
c. The Managed Dialogue Protocol

E. Android Securtiy
1. Overview of Security Concepts
2. Signing application for deployment
3. Performing runtime security checks

F. Telephony Application Programming Interface (API)
1. SMS
2. Telephony Manager

G. Databases and Content Providers
1. SQLLite
a. Opening
b. Querying
c. Extracting
2. Content Providers
a. Creating
b. Using
c. The Native Android Content Providers

H. Files, Saving State and Preferences
1. Saving Application Data
2. Creating and Saving Preferences
3. Retrieving shared Preferences
4. Preference Activity
5. The Preferences Framework
6. Saving Activity State
7. Files
a. Saving
b. Loading
c. Static Files as Resources

VI. METHODS OF INSTRUCTION:
A. **Classroom Activity** - Student team-based analysis and solution design activities to enhance the content presented
B. **Lab** - Both programming and user interface design assignments
C. **Discussion** -
D. **Demonstration** -
E. **Lecture** - Including interactive activities

VII. TYPICAL ASSIGNMENTS:
A. Create an Android application that will maintain a list of user's friends, including names, birthdays, addresses, emails and phone numbers. It should allow the user to enter new friends, and to delete or updating existing ones. The program will alert the user three days before the birthdate of each friend in the list.
B. Create an Android application that lets the user create and use vocabulary flash cards. The program will allow the user to enter the contents for a each card, including a word and a definition. In practice mode, the program will show the each card's word, asking the user to select showing the definition or advancing to the next card.

VIII. EVALUATION:
A. **Methods**

1. Exams/Tests
2. Quizzes
3. Projects
4. Class Participation

B. **Frequency**

1. At least two in-class midterm examinations, or one in-class midterm examination and several quizzes
2. One in-class comprehensive final examination

3. Several programming assignments of sufficient size and complexity to incorporating all concepts in the course.

IX. TYPICAL TEXTS:

1. Horstman, Cay. *Core Java, Volumes 1 and 2.* 10 ed., Prentice Hall, 2016.
2. Horton, John. *Android Programming for Beginners.* First ed., Packt Publishing, 2015.
3. Android Studio. Google, (Current).
4. Java Development Kit. Oracle, (Most Recent).

X. OTHER MATERIALS REQUIRED OF STUDENTS:

A. USB based memory device for storing classroom work and projects for use outside of the classroom environment