Course Coverage

**Course Learning Outcomes (CLO):**
1. Understand the technical limitations and challenges posed by current mobile devices and wireless communications; be able to evaluate and select appropriate solutions.
2. Describe the components and structure of a mobile development frameworks and learn how and when to apply the different components to develop a working system.
3. Select and evaluate suitable software tools and APIs for the development of a particular mobile application and understand their strengths, scope and limitations.
4. Describe and work within the capabilities and limitations of a range of mobile computing devices.
5. Describe and apply the different types of application models/architectures used to develop mobile software applications.
6. Ability to enhance students' practical skills in the development of software applications for mobile devices.
7. Design, implement and deploy mobile applications using an appropriate software development environment; Learn to design, write and test small interactive programs for mobile devices.
8. Design and develop computing system to extend and enhance the capability of mobile applications; Ability to conduct major mobile programming projects.

**Student Outcomes (SO):**
(A) An ability to apply knowledge of computing and mathematics appropriate to the discipline
(B) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
(C) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
(D) An ability to function effectively on teams to accomplish a common goal
(E) An understanding of professional, ethical, legal, security and social issues and responsibilities
(F) An ability to communicate effectively with a range of audiences
(G) An ability to analyze the local and global impact of computing on individuals, organizations, and society
(H) Recognition of the need for and an ability to engage in continuing professional development
(I) An ability to use current techniques, skills, and tools necessary for computing practice.
(J) An ability to use and apply current technical concepts and practices in the core information technologies.
(K) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems
(L) An ability to effectively integrate IT-based solutions into the user environment.
(M) An understanding of best practices and standards and their application.
(N) An ability to assist in the creation of an effective project plan.
Course Lectures and Labs:
Books:
- BAAD: Wei-Meng Lee, "Beginning Android 4 Application Development"
- PAAD: Reto Meier, "Professional Android 4 Application Development"

Weeks 1:
- Reference: BAAD Ch. 1,2,3, PAAD Ch. 1,2
- Labs:
  - Setting up Eclipse and Android Environment (BAAD Pg 20)
  - Writing codes in HTML5 for location tracking.
  - Use PhoneGap to develop an apk with the developed HTML5 location tracking code.

Week 2:
- Reference: BAAD Ch. 1,2,3, PAAD Ch. 1,2
- Labs:
  - Understand Android Code life cycle (BAAD Pg 38)
  - Introducing Dialog Window & Progress Box (BAAD Pg 42 & 47)
  - Retrieve and learn about dex files
  - Use adb command to install and uninstall an application on the emulator/device
    - Check for logs using adb command like: adb –d logcat *:S Activity:*
  - Learn the impact of manifest file on R.java.
  - Learn about the lifecycle of an activity.

Week 3:
- Lecture: Android Fundamentals: Files, Saving State, Preferences, Databases and Content Providers
- Reference: BAAD Ch.6,7, PAAD Ch. 7, 8
- Labs:
  - Linking Intents and getting results (BAAD Pg 53 & 59)
  - Write an application to handle various predefined actions (ACTION_CALL & ACTION_BATTERY_LOW) using Intents.
  - Use intents to invoke the Messaging or Browser or phone call panel.
  - Handling conflicts in intents (an intent is used to invoke two activities).
Week 4:
- Lecture: Android Fundamentals: Files, Saving State, Preferences, Databases and Content Providers
- Reference: BAAD Ch.6,7 , PAAD Ch. 7,8
- Labs:
  - Learn about the lifecycle of a fragment.
  - Fragments and Communications between them (Pg 81)
  - Use Fragments to display two or three fragments at a time based on the width of the emulator/device.
  - Intents + Fragments + Notifications (BAAD Pg 85 & 98)

Week 5:
- Lecture: Beyond Basics I: Services, Processes, Threads, and Broadcast Receivers
- Reference: BAAD Ch.11 , PAAD Ch. 9
- Labs:
  - Write an application to display contact details on a tabular format (The tabs are for each group of contacts)
  - Working on Database (BAAD Pg 274 & 279)
  - Contact retrieval (BAAD Pg 280)

Week 6:
- Lecture: Beyond Basics I: Services, Processes, Threads, and Broadcast Receivers
- Reference: BAAD Ch.11 , PAAD Ch. 9
- Lab:
  - Database Bundling (BAAD Pg 286)
  - Retrieve information and display them using ScrollView and ListView. Compare their differences once the list is longer than the height of the emulator/device.
  - Content Providers (BAAD Pg 295)
  - Creating and using our own Content Providers (BAAD Pg 305 & 314)

Week 7:
- Lecture: Beyond Basics II: Maps and Location-Based Services + JSON
- Reference: BAAD Ch. 9 & 10, PAAD Ch. 13
- Labs:
  - Animation from the newly created UI
- ImageView and Management of images
- Layouts and Orientations (Pg 130)
- Creating UI Programmatically (Pg 146) + views (Pg 168)

Week 8:
- Lecture: Beyond Basics II: Maps and Location-Based Services + JSON
- Reference: BAAD Ch. 9, PAAD Ch. 13
- Labs:
  - Service Vs Intent Service (PAAD Ch9)
  - Tasks (BAAD Pg 439 & 442)
  - Invoke a service based on a receipt of a notification
  - AsyncTask and updating the UI
  - Runnable Threads

Week 9:
- Lecture: Beyond Basics III: Sensors
- Reference: BAAD Ch, PAAD Ch.
- Labs:
  - Shared Preferences (BAAD Pg 252 & 259)
  - Internal Storage (BAAD Pg 263)
  - Creating Service (BAAD Pg 430)
  - Threads (BAAD Pg 458)

Week 10:
- Lecture: Beyond Basics III: Sensors
- Reference: BAAD Ch., PAAD Ch. 12
- Labs:
  - Creating Google API Account (BAAD Pg 352)
  - Maps Navigation (BAAD Pg 364)
  - Navigating map based on touch and geocoding + linking to an activity (BAAD Pg 371)

Week 11:
- Lecture: Advanced Android I: Audio, Video, Telephony and SMS
- Reference: BAAD Ch. 8, PAAD Ch. 15, 17
- Labs:
  - Sending and receiving SMS (BAAD Pg 329)
  - MediaPlayer with background threads

Week 12:
- Lecture: **Advanced Android I: Audio, Video, Telephony and SMS**
- Reference: BAAD Ch. , PAAD Ch. 15, 17
- Labs:
  - WebView to display Webpages
  - Download the requested media via background thread and update a progress bar based on the download process

Week 13:
- Lecture: **Advanced Android II: Bluetooth, Networks, and Wi-Fi**
- Reference: BAAD Ch. 10, PAAD Ch. 16
- Labs:
  - Handling HTTP Connections with threads
  - JSON (BAAD Pg 411)
  - Application publishing (BAAD Pg 467)

Week 14:
- Lecture: **Advanced Android Development & Looking Forward**
- Reference: BAAD Ch. , PAAD Ch. 18, 19
- Lab: NO LAB in this week

Assignment 1: Student Assignment Management System
Application should contain the following:
- Application should start with a nice Progress bar
- Student should be able to enter his assignments based on a date (should have Date Picker)
- Should be able to search based on date or assignment details
- Display the assignments using a list
- Assignment entries could be modified or changed
Assignments due should be notified three days in advance

Assignment 2: Enhanced Student Assignment Management System
- Make sure that your application is suitable for more than one device.
- Application should read assignment information from website or xml or feeder
- Vibrate or do some activity to the mobile to indicate assignment submission dateline is due on the specified date
- Reminder for exams or tests should be included.

Lab Project: Location Tracker Application.
- Retrieve information using Google maps and indicate the current latitude and longitude.
- If a specified location is touched, appropriate geocoding or reverse geocoding should be performed.
- Invoke the application based on time or location
- Retrieve information from RSS feeder and locate a location on the map based on where an event is conducted.

Possible Lab Assignments:
1. Switch news information obtained from one news site to another.
2. If the existing application has no database or the format of the existing database is different. Then, how to generate and design the new application efficiently.
3. WebView for a database
4. WebView to handle flash files
5. Context friendliness of the application: tags for places in google map, indicates or notifies about accidents or crowded areas
6. Server for API tasks
7. Manually handling orientation changes
8. Digest / Basic authentication; Authentication to Web Service.
9. Timeout for URL Connection
10.

Write Android Programs to do the following:
1. Menu Inflater
2. onClick on Menu?
3. What is the use of R.id.home
4. Read the status of the application and show a progress dialog box until the application is ready
5. Orientation fixing:
a. Fix the orientation of the whole application
b. Fix the orientation of a specific activity (view) in an application
c. Else, keep individual versions for different orientations

6. Size adjustment of your application based on the device. Use Anchoring.
7. Create your own styles and themes to make the UI look better
8. Generate a simple application with UI programmatically designed
9. Each application should have appropriate EventListeners
10. Display menus from xml and/or program. Make sure to handle Context Menu
11. Differentiate between a Toast and a Notification

12. Storing of information:
   a. Using shared preferences
   b. Using local and external storage
   c. SQlite
   d. Existing and your own Content Provider

13. Services:
   a. AsyncTask
   b. Threads
   c. BroadcastReceiver
   d. Intent Service
   e. Wake Lock

14. Internationalization of the code (Supporting Arabic)
15. WebView in a separate thread than the UI? WebViewClient
16. Custom view (Draw to screen size)
17. Service does not start on onCreate
18. JSON, GSON
19. onIntentReceive
20. What happens if you two launch activities in the Manifest?
22. InfoWindowAdapter

Tasks to check for:
1. Lit in android to check for errors or suggestions
2. SDK vs NDK
3. JSONP
4. Blocking browser from sending user-agent information
5. Loading asynchronously, using ajax style
6. jQuery Mobile library
7. Stopping of the mobile vibration when the mobile is charging
8. Possibility of C# for mobile
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