# Description: Description: cid:ii_hvdlwih90_14613f15db7a4b70

# United States International University

**Summer Semester 2016**

##### SWE6130 MOBILE APPLICATIONS DEVELOPMENT

##### (Course Outline)

***Lecturer Dr. Gerald Chege*; email:** [***gchege@usiu.ac.ke***](mailto:gchege@usiu.ac.ke) ***;* Lillian Beam Building– 3rd Flr. Rm. 4**

**Class Times: Thursday 5.40pm–9.00 pm (Lab 2)**

**Office Hours: Tuesday/Thursday 9.00am - 11.00am; 3.00pm - 5.00pm**

**COURSE DESCRIPTION**

Mobile Application Development aims to teach students how to develop mobile applications using the Java 2 Platform, Micro Edition (J2ME). The course focuses on the Connected Limited Device Configuration (CLDC) and Mobile Information Device Profile (MIDP) of J2ME. Students will also learn how to architect and develop enterprise applications using J2ME, XML, JDBC, Servlets and JSP/JSTL upon finishing this course. This course is concerned with the development of applications on mobile and wireless computing platforms. Android will be used as a basis for teaching programming techniques and design patterns related to the development of standalone applications and mobile portals to enterprise and m-commerce systems. Emphasis is placed on the processes, tools and frameworks required to develop applications for current and emerging mobile computing devices. Students will work at all stages of the software development life-cycle from inception through to implementation and testing. In doing so, students will be required to consider the impact of user characteristics, device capabilities, networking infrastructure and deployment environment, in order to develop software capable of meeting the requirements of stakeholders.

*Credit: 3 Units*

*Pre-requisite: MIS 6120* *Mobile Computing*

**Link to University Mission Outcomes and School of Science & Technology**

**(a) Link to University Mission Outcomes**

The course content for APT2080 directly contributes to the attainment of University Mission Outcomes in:

1. Higher Order Thinking (U1)
2. Literacy (U2)
3. Preparedness for Career (U3)

**(b) Link to School of Science & Technology Mission Outcomes**

The course content contributes to the School of Science & Technology Mission Outcomes in:

1. Developing competence in critical thinking, creative skills, use of technology, creativity and good communication skills (O-1)
2. Demonstrating preparedness for career and lifelong learning in their chosen disciplines as well as understanding of the interdisciplinary nature of knowledge. (O-3)
3. Demonstrating the use of qualitative and quantitative research skills in Biomedical, Communication and Information Technology (O-4)
4. Applying theories, concepts, and principles found in biological and physical sciences, including a thorough grounding in communication skills in multicultural & global perspectives. (O-5)
5. Demonstrating a thorough understanding of effective, efficient professional and ethical leadership (O-6).

**Course Learning Outcomes**

By the end of this course, the student will be able to:

1. Demonstrate understanding of mobile programming principles;
2. Write well designed mobile programs using the Android platform;
3. Design and write programs running on Emulators;
4. Deploy programs on physical mobile devices;
5. Demonstrate understanding and usage of many of the Android classes;
6. Deploy programs in Google Play market place;

**Course Content Summary**

Introduction to Android; Android Overview; The Android Stack; Dalvik VM; The Android Development Environment; The Activity Class; Activity stack; Tasks; The Activity Lifecycle; The Intent Class; Intents and Intent Filters; Android User Interface; Design Principles; Views & Layouts; Event Handling; Permissions and Permission Architecture; Android Services; Service Class; Implementing a Service; Broadcast Receivers; Broadcast Receiver Use Case; Registering Broadcast Receivers; Content Providers; Content Resolver; Data Model; Content URIs; Data Management; Single Application Persistent Data Storage; Data Storage Options; Files; File API;

Reading and Writing an Internal Memory File; Cache Files; External Memory Files; Shared Preferences: Persistent map; Reading & Writing Shared Preferences; SQLite Database; Opening and using a Database; CRUD Operations; Networking; Networking Permissions; Using Sockets

Using URLConnection; Using HTTPClient; JSON; XML; Threads; AsyncTasks & Handlers; Android Threading; Location & Maps; Location Services; Maps and Maps Classes; Notifications & Alarms; Toast; Dialogs; Status Bar Notifications; Creating Notifications; Alarms; Alarm manager;

Creating Alarms; Multimedia; Programming Some Multimedia Classes; Audio Manager; Media Player; Camera; Sensors; Sensor Manager; Registering for Sensor Events; Non-Android device development platforms, e.g. IBM MobileFirst

**Course Content**

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| --- | --- | --- | --- |
| WEEK | TOPIC | Assignments/ Labs | Book Chapter/ Aids/References |
| WEEK 1 | **Introduction to Android**;   * Android Overview * Android Versions * Application framework * The android Stack; Dalvik VM * Android Application Fundamentals; * The Android Development Environment; Manifest File; resources; The Emulator; The R-File | Lab #1 (First Android program) | Chapter 1, 2 & 3 |
| WEEK 2 | **The Activity Class**:   * Introduction to Android Activity * Activity stack * Tasks The Activity Lifecycle   **Intents and Intent Filters:**   * The Intent Class * Using Intents to Activate Activities * Explicit and Implicit Activation * Intent Resolution * Specifying IntentFilters | Lab #2 – Activity life Cycle | Chapter 4 |
| WEEK 3 | **Android User Interface**   * Design Principles * Views & Layouts * Event Handling * Menus * Dialogs   **Permissions**   * Permission Architecture * Defining Permissions * Requiring Application Permissions * Component Permissions * Activity Permissions * Service Permissions * BroadcastReceiver Permissions * ContentProvider Permissions | Lab (UI & Permissions) | Chapter 6 |
| WEEK 4 | **Android Services**   * Service Class * Sample Services: Logging service; ID Service; Music Player Service * Implementing a Service * Android Interface Definition Language (AIDL) * Define Remote Interface * AIDL Syntax * Implement Remote Methods * Implement Service Methods * Implement Client * RPC Interface   **Broadcast Receivers**   * What are BroadcastReceivers? * BroadcastReceiver Use Case * Registering BroadcastReceivers * Static & Dynamic Registration * Event Broadcast: Normal vs. Ordered; Sticky vs. Non-Sticky; * Event Handling; | Lab (Services)  Lab (Broadcast Receivers) | Chapter 8  Chapter 14  Chapter 11 |
| WEEK 5 | **Content Providers**   * Databases for reading & writing data * ContentResolver * Data Model * Content URIs | Lab (Content Providers  ) | Chapter 12 |
| WEEK 6 | **Data Management**   * Single Application Persistent Data Storage * Data Storage Options * Files:   File API;  Writing an Internal Memory File Reading an Internal Memory File Cache Files External Memory Files   * Shared Preferences: Persistent map * Reading & Writing Shared Preferences * SQLite Database * Opening and using a Database * CRUD Operations | Lab (Data Management) | Chapter 7 & 9 |
| WEEK 7 | Review & Mid Semester Exam |  |  |
| WEEK 8 | **Networking**   * Networking Permissions * Using Sockets * Using URLConnection * Using HTTPClient * JSON * XML * Parsing XML   **Threads, AsyncTasks & Handlers**   * Android Threading * Thread methods * The UIThread * AsyncTask * Thread Handlers | Lab (Networking)  Lab (Threads) | Chapter 14  Chapter 6 |
| WEEK 9 | **Location & Maps**   * Location Services * LocationProvider * LocationManager * Obtaining Location * Determining Best Location * Maps and Maps Classes | Lab (Location Maps) | Chapter 13 |
| WEEK 10 | **Notifications & Alarms**   * Notifications Types:   + Toast   + Dialogs   + Status Bar Notifications * Creating Notifications * Alarms * Alarm manager * Alarm Types * Creating Alarms | Lab (Notifications & Alarms) | Chapter 13 |
| WEEK 11 | **Multimedia**   * Programming Some Multimedia Classes: * AudioManager * SoundPool * RingtoneManager & Ringtone * MediaPlayer * MediaRecorder * Camera | Lab (Multmedia) |  |
| WEEK 12 | **Sensors**   * SensorManager * SensorEvent * Sensor Coordinate System * Registering for SensorEvents * Accelerometer Example   **Non-Android device development platforms:**   * Overview of IBM MobileFirst | Lab (Sensors) |  |
| WEEK 13 | **Projects -** Presentation of Projects |  |  |

**Mode of Delivery**

Lectures and delivery through the Blackboard e-learning platform. Presentations by members of the class, Case discussions, Tutorials, Assignments, group work, practical laboratory-based work, Library, appropriate software, manual/notes, classroom based tutorial exercises and directed self-study.

**Instructional Material and/or Equipment**

Textbooks, whiteboard, handouts, seminars, electronic projector and laptop, Internet access, special graphics software’s and library.

**Course Text**

*Learning Android, Marko Gargenta, O'Reilly Media (2011)*

**Recommended Reference Materials**

# [Harvey Deitel](http://www.pearsoned.co.uk/bookshop/Results.asp?iCurPage=1&Type=1&Author=+Harvey+Deitel&Download=1&SearchTerm=+Harvey+Deitel), Android How to Program 3rd Edition (2016)

1. Ed Burnette, Hello Android, Introducing Google’s Mobile Development Platform, Pragmatic Programmers (2008);
2. Neil Smyth Android Studio Development Essentials - Android 6 Edition (2015), Payload Media
3. *Communication of the ACM Journals*
4. *IEEE Computer Journals*

**TEACHING METHODOLOGY**

A mixture of lectures, presentations by members of the class, case discussions, tutorials, assignments, continuous assessment tests, lab practicals, library, appropriate software, manual/notes, simple projects. Regular attendance and active participation in this class are expected. This is a course that is experiential and requires active involvement to gain maximum benefit. To get involved you must attend class, spend time on the textbooks, WWW and all other provided materials. The student is expected to spend 9 hours every week outside class to complete assignments and study for the course.

**COURSE EVALUATION**

**Grading**  
Your final grade will be based on several indicators of performance.

**MARK DISTRIBUTION**

Laboratory work: 10%

Assignment 1: 5%

Assignment 2: 10%

Assignment 3: 5%

Quizes: 5%

Project: 15%

Mid-Quarter Exam: 20%

Final Exam: 30%

EXAMINATIONS

Mid-Semester Exam: Week 7

Final Exam: Week 14

**Exams**: The exams will cover all chapters listed on the schedule, the material discussed in class lectures, all additional handouts, the term project and the assignments during the Semester until the time point of examination.

**Assignments:** The assignments are designed to be active learning experiences, supplementing class discussions and reading assignments.

**Notes:** Will be made available online in Blackboard.

**Readings:** You are expected to read all materials that are mentioned in the above table in the column "Aids/References" for the assigned week in advance so that you are well prepared for lectures and tutorials. Otherwise you won't be able to participate actively in the lectures and can't complete the tutorials.

**Class Policy**

* Mobile phones should be switched **OFF** during class session.
* Computers should be turned **OFF** during the theory session and used to complete LAB exercises only during practical session.
* Students who come 10min after class has started will not be allowed into the classroom.

**Plagiarism and cheating:** Plagiarism and cheating are considered to be acts of misconduct as per university’s academic code of conduct and ethics. Any student who commits plagiarism or cheating in the university examination will be subject to sanctions up to and including dismissal from the university. **Absenteeism:** Students are expected to attend all classes. Upon being absent from seven (7) classes, a student will get an **F** for the course. If you have to be absent, please contact your instructor in advance.

**USIU GRADING SYSTEM**

|  |  |
| --- | --- |
| A 90 – 100  A- 87 - 89  B+ 84 - 86  B 80 - 83  B- 77 - 79  C+ 74 - 76 | C 70 – 73  C- 67 – 69  D+ 64 - 66  D 62 - 63  D- 60 - 61  F 0 – 59 |