Farmingdale State College
State University of New York

Computer Systems Department

Android Mobile Application Development | BCS 421 | 3 Credits

Prerequisites: BCS345 with a grade of C or better.
Meetings: In-person
Type of Instruction: Check blackboard

Professor: Moaath Alrajab
Office: Whitman Room 109
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Email: Moaath.Alrajab@farmingdale.edu
Skype: MoaathAlrajab

Office Hours:

- Please arrange the appointment through the following link for both in person and virtual office hour meetins:

https://outlook.office365.com/owa/calendar/MAlrajabCLasses@Farmingdale.onmicrosoft.com/bookings/

Catalog Course Description:
This course provides an introduction to Android mobile application development. Techniques for designing the user interface will be discussed. The Android application lifecycle and issues related to battery life will be covered. Storing application data using a database will be explored. Students will receive hands-on experience using the Android mobile application development platform.

Course Learning Outcomes:
At the completion of this course, students will be able to:

1. Use and identify the essentials of the Android mobile application development platform.
2. Create applications and activities.
3. Use and implement Android application lifecycle in apps.
4. Deploy material design for attractive user interfaces.
5. Use intents and broadcast receivers.
6. Demonstrate the ability to persist data by using Android methods.
7. Use Android services and background threads.
8. Deploy and develop web services and connect to real-time databases.

General Course Requirements and Learning materials

- Lecture notes.
- Instructor provided links to online resources.
- ***Textbook***:
  a) Required: **ZyBook**
    - **Sign in or create an account at learn.zybooks.com**
    - **Enter zyBook code: FARMINGDALEBCS421AlrajabFall2022.**

- *Primary*: Android Development: Lecture Notes, by Joel Ross. This is an OER course that can be

accessed from https://info448.github.io

- *Supplementary*: The Busy Coder's Guide to Android Development for Android Studio 3.0, covering the Android SDK through 8.1, by Mark Murphy.

Evaluation:

• Participations and team discussion	10%	Weekly updated
• Labs and assignments	10%	Weekly updated
• Individual projects	30%	Weeks 5, 9, and 12
• Exam	20%	Week 10
• Team project	30%	Week15

Farmingdale Grading System

Minimum Grade Percentage Equivalent	Grade	GPA Equivalent	Interpretation
93.0	A	4.00	Excellent
90.0	A-	3.67	
87.0	B+	3.33	
83.0	B	3.00	Good
80.0	B-	2.67	
77.0	C+	2.33	
73.0	C	2.00	Satisfactory
70.0	C-	1.67	
67.0	D+	1.33	
60.0	D	1.00	Minimum Passing
0	F		Failure
0	I		Incomplete
0	W		Withdrawal
0	UW		Unofficial Withdrawal

Course contents and tentative schedule

Date	Topic	Student Learning Outcomes
Week 1	Module 1: Introduction and Overview of Mobile Computing and Android ○ Background on Android and mobile computing ○ Android Software Stack ○ Creating an Android Project and navigating in Android Studio ○ Laying Out the UI and discussing the view hierarchy ○ Widget/Control attributes ○ Creating string resources	○ Install and use Android Studio IDE. ○ Demonstrate an understanding of the structure of an Android project (xml, assets, configurations and so on) ○ Run a simple app using the built-in emulator ○ Connect Android device to Android Studio

Date	Topic	Student Learning Outcomes
	○ Previewing the layout ○ From Layout XML to View Objects ○ Using code completion ○ Running on the emulator	
Week 2 **Week 3**	Module 2: Kotlin Syntax and language features	○ Demonstrate an understanding of Kotlin and its applications
Week 4 **Week 5**	Module 3: Android Fundamentals ○ Model-View-Controller and Android ○ Benefits of MVC and how to use it ○ Configuring your device for development ○ Adding resources to a project ○ Referencing resources in XML ○ The activity lifecycle ○ Logging the activity lifecycle ○ Exploring the activity lifecycle by example ○ Rotation and the activity lifecycle ○ Device configurations and alternative resources ○ Saving data across rotation ○	○ For the Hello World App: 1.1) Change app name and add more controls. 1.2) Implement events Handlers and add a Toast. ○ Identify Android fundamental building blocks and components. ○ Demonstrate an understanding of the Activity lifecycle. ○ Discuss MVC and Android Resources. ○
Week 6 **Week 7**	Module 4: Intents, Data passing, and Debugging ○ Exceptions and stack traces ○ Diagnosing misbehaviors ○ Logging stack traces ○ Android-specific debugging ○ Using Android Lint ○ Creating a new activity ○ A new activity subclass ○ Declaring activities in the manifest ○ Starting an activity ○ Communicating with intents ○ Passing data between activities ○ Using intent extras	○ Demonstrate an understanding of Android Intents. ○ Experiment with passing data between activities. ○ Use the Android Studio debugger and experiment with Android Accessibility rules. ○ Demonstrate an understanding of the importance of app performance ○ Underline Android fragments
Week 8	Module 5: Fragments ○ The Need for UI Flexibility ○ Introducing Fragments ○ Adding dependencies in Android Studio ○ Hosting a UI Fragment ○ The fragment lifecycle ○ Defining a container view ○ Creating a UI Fragment	○ Demonstrate an understanding Android fragments and its lifecycle. ○ Design a UI fragment to the FragmentManager and use Fragment transactions. ○ Inspect storing data using shared preferences.

Date	Topic	Student Learning Outcomes
Week 9 **Week 10**	Module 6: Persistent Data ○ Shared preferences ○ Files ○ SQLite databases ○ Defining a schema ○ Exploring files using Android Device Monitor ○ Writing to the Database (SQL, NoSQL) ○ Using ContentValues ○ Inserting and updating rows ○ Reading from the database Using a CursorWrapper	○ Develop apps that utilize SharedPref and Files. ○ Develop apps that utilize Android Databases - SQLite. ○ Apply Android best practices with Persistent Data. ○
Week 11 **Week 12**	Module 7: Styles, Themes, and Material Design ○ Color resources ○ Styles ○ Style inheritance ○ Themes ○ Modifying the theme ○ Adding theme colors ○ Overriding theme attributes ○ Theme spelunking ○ Modifying button attributes ○ Surfaces ○ Transition ○ Elevation shadows and cards Animations drawables	○ Experiment with color resources, styles, style inheritance, themes. ○ Examine Android themes and theme colors ○ Use surfaces and transition, elevation, shadows, and cards.
Week 13 **Week 14**	Module 8: Real-time Databases and Google Maps ○ Real-time databases – Firebase ○ Creating web services and jar libraries ○ Google Maps, Location, and GPS. ○ Image and Video Cloud Storage.	○ Distinguish between local and remote Realtime databases. ○ Examine the use of Firebase database. ○ Apply Firebase Auth and use database rules. ○ Experiment with the use of Android sensors and Google Maps. ○ Develop location-based apps.
Week 15	Final	

Important Note

The College retains sole discretion regarding the method of course delivery (ex: in-person, distance, hybrid, etc.) and may not be able to alter the method of instruction for students who are obligated to isolate or participate in precautionary quarantine as required by a healthcare provider or the Department of Health.

All individuals are required to be masked in all educational and indoor public spaces regardless of vaccination status

Cancelation of Classes:
Weather and other campus-wide cancellations will be listed on the home page, Facebook and Twitter and you can also sign up for RAVE and SUNY Alert. Go to the Rave web page and use your Farmingdale user ID and password to enter the site. For SUNY-Alert, please visit the University Police web page. All other cancellations will be announced through Blackboard.

Electronic Devices Policy:
Students are encouraged to use their laptops and devices in this course. The laptop needs to have a recommended 16 GB of memory. The Android device software should be up to date.
Aside from class work, it is important that you and your classmates are not being distracted from learning. Make sure your electronic devices are on silence mode prior to your entering the classroom. Laptop computers – if used in class - are to be used for academic work only, not for recreational means or surfing of the Internet.

Attendance Policy:

Attendance is mandatory. Missing classes affects your grade as described above (Grading). Participation and assignments are discussed in the classroom and updated weekly. Excused absences include illness (a doctor's note is needed) or a serious personal crisis. In such case, a letter from the Dean of students is required.

- Travel time is not an excused absence.
- Sporting events are not excused absences.
- Car breakdown is not an excuse for absence.

You are expected to take the examinations at the times that will be indicated. Missing an exam or test creates a very difficult situation for all parties involved. As such make-up for missed tests will be administered under extreme circumstances. The attendance policy applies to a missed test. A missed test will be considered an unexcused absence.

Assignments, quizzes, and homework are to be handed as stated and on the day they are due. Nothing will be collected from the instructor's mailbox, email, or any other place/method. You should, therefore, assume that the deadline is a couple of days ahead of time, to cover yourself for possible problems. That way you will have time to print and proofread your work. Nothing will be accepted after the due date and time.

Religious Absences:
If you are unable to attend class on certain days due to religious beliefs, please consult with your instructor well in advance of the absence so that appropriate accommodation can be made.

Use of Email:
It is College policy that instructors and students use the Farmingdale email system or the Blackboard email system to contact one another.

Copyright Statement:
Course material accessed from Blackboard or the Farmingdale website is for the exclusive use of students who are currently enrolled in the course. Content from these systems cannot be reused or

distributed without written permission of the instructor and/or the copyright holder. Duplication of materials protected by copyright, without permission of the copyright holder, is a violation of the Federal copyright law, as well as a violation of SUNY copyright policy.

Disability Services Center:
If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Disability Services Center, Roosevelt Hall, Room 151, or call 631-420-2411, or 420–2607 as soon as possible this semester.

Academic Integrity Policy
Because intellectual honesty is a cornerstone of all academic and scholarly work, each member of the Farmingdale State College campus community is expected to maintain academic integrity. Farmingdale State College has developed regulations concerning academic dishonesty and integrity to protect all students and to maintain an ethical academic environment. For more information, click the updated link for the college-wide Academic Integrity Policy.

It is important for you to understand the concept of plagiarism. Plagiarism is intentionally representing the words, images or ideas of another as one's own in any academic exercise. This includes words, images or ideas in either print or electronic format.

In addition to the general college-wide academic policy linked above, the BCS department has adopted its own academic integrity policy, which supplements the college-wide policy. Students in this class are subject to both the college-wide and the department policy. The department policy is below.

Student Code of Conduct
The President of the College and the Vice President for Student Affairs recognize the rights of designees including University Police, to enforce all regulations, policies, license agreements, laws and codes on campus. If any individual allegedly violates the laws, Student Code of Conduct or campus policies, a President's designee will institute proceedings against the offender (s). For more information on the student code of conduct, see the Code of Conduct section in the current Student Handbook, or choose Code of Conduct from the A-Z Links.

University Police
631-420-2111