SUNY OLD WESTBURY

DEPARTMENT OF MATHEMATICS AND COMPUTER & INFORMATION SCIENCE

SYLLABUS

MOBILE PROGRAMMING VIA ANDROID CS4200

Prerequisite: A grade of C or higher in **CS 3810**

COURSE DESCRIPTION: This course introduces students with creating mobile applications through the Android programming environment. Builds upon previous programming knowledge of Data Structures and Algorithms to learn the basics of application development in the Android environment using Kotlin. Students will learn the fundamentals of event driven multi-tier programming, including important programming patterns that best fit the unique needs of mobile devices. Furthermore, students will learn how to create interactive GUIs that leverage mobile capabilities, including data from embedded devices such as cameras and sensors such as GPS, in order to create novel and accessible experiences and representations for users. Students will learn to use databases to store and retrieve data as well as use APIs to retrieve data from websites. By class-end students will have created multiple mobile applications to add to their portfolio.

COURSE OBJECTIVES:

- Learn how to create the three elements of an MVC project in Android
- Learn how to do projects with multiple activities
- Understand the different Android Interfaces one can implement
- Learn how to self-educate using the Android documentation
- By the end of the classes students should be able to conceptualize an Android app and implement it with concise professional code as a course project

TEXTBOOK: **No textbook required.** Study materials and lecture slides will be provided through Brightspace.

PROGRAMMING LANGUAGE AND TOOLS: Kotlin. All work should be done in Android Studio. It is also helpful to have a cheap Android device on hand to test your projects.

TOPICS TO BE COVERED*

- Kotlin basics
  - Variables (nullable and non-nullable, null safe operations) and safe casting
  - Functions, function aliases, lambdas, and anonymous functions
  - Classes, data classes, inheritance and interfaces
- Layouts, Gradle, and the Manifest

    - GUI Widgets and event based programming
- Model View Controller
- Coroutines to Run Background Tasks and APIs
    - App Permissions
- Activities and multiple activities
    - Explicit Intents
    - Passing data between activities
- The Activity Life Cycle and interruptions
    - Saving Activity state
- Persistent Data
    - local DB with sqlite or Rooms
    - Cloud db with Firebase (and intro to Google services)
- Graphics and Animations
- Sensors (GPS, accelerometers etc.)
- If time students can request topics or pursue another topic in the final project stages

* The topics may vary slightly and need to be adjusted as we move through the semester.