CS 5520: Mobile App Dev Syllabus

Spring 2025

Instructor Information

Instructor	Email	Office Location & Hours
Dr. Daniel Feinberg	d.feinberg@northeastern.edu	Online by appointment

General Information

Description

This project-oriented course examines the principles of mobile application design and development. Students will learn application design and development using the Android platform. Topics will include memory management; user interface design; user interface building; input methods; data handling; network techniques and URL loading; and, finally, specifics such as use of mobile sensing. Students are expected to design and develop a professional-quality mobile application that addresses a real-world problem in an innovative way. Coursework will include project conception, design, implementation, and pilot testing of mobile phone software applications.

Course Objectives

By the conclusion of this course, students will be able to:

- Describe those aspects of mobile programming that make it unique from programming for other platforms
- Critique mobile applications on their design pros and cons
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces
- Program mobile applications for the Android operating system that use basic and advanced phone features[1]

Students will have created an innovative and robust mobile application that will be valuable addition to their programming portfolio. Students will have gained experience describing application concepts in writing and in oral presentations.

Classroom Format

It is expected that you do the readings and watch the videos. Some readings will be marked as *references*, and you should familiarize yourself with these without necessarily reading every word.

This is an online class, and you may be accustomed to campus classes where you show up for lecture at a scheduled time and do the assigned work later in the week. With this online class, the lecture can be viewed any time during the week. It will be up to you to schedule your time to work through the materials and do the assignments. If you wait until later in the week to start viewing the lectures and do the assigned work, you will find yourself overloaded on the weekend. In other words, don't wait until your normal homework time to start with the course materials for the week. Start working through the materials earlier in the week. For a four credit hour course such as this course, you should expect a minimum of 200 minutes of instruction plus 8-12 hours of homework. That's 11 to 15 hours total. A 15 hour Sunday is a bad idea.

Grading

Your grade will be comprised of the following components:

[1] While the Android API is used in this course, the focus is on using Android as a platform to learn broader concepts in mobile application development as well as other skills listed in this syllabus.

- Assignments: 60%
- Group Project: 30%
- Discussion: 10%

Failure to contribute to your group project will result in an adjustment to your project grade to reflect your contribution. If you skip discussions or assignments, you will not be able to make them up later. Concerns about a grade must be raised within two weeks of the posting of the grade to be considered for correction.

The following grading scale is expected to be used at the end of the semester. I reserve the right to use a curve if required by circumstances. Grades will reflect overall performance in the class, and I cannot adjust grades because you want a higher grade to get a co-op or other need.

95% and above A, 90% - 94.99% A-, 87% - 89.99% B+, 84% - 86.99% B, 80% - 83.99% B-, 77% - 79.99% C+, 73% - 76.99% C, 70% - 72.99% C-, Less than 70% F

Class Resources

Canvas will be used for course materials, as well as for announcements and assigned discussions. Piazza will be used for questions.

Course Materials

Required Readings

Smyth, Neil (November 12, 2024). Android Studio Ladybug Essentials - Java Edition. Payload Media.

The book is available for purchase from Amazon in both paper and Kindle formats. Be sure to get the Java edition, not the Kotlin edition. This book is updated frequently, and if you see a more recent version offered, inquire before buying the older version. Check Canvas for the most up to date version of the syllabus before you order the book, especially if you received this syllabus more than a week before the start of the semester.

Online Android programming resources (https://developer.android.com/studio/intro/index.html).

In addition, students will read papers on the design of mobile applications that will be available online or made available via Canvas.

Suggested

There is no shortage of Android programming books, but the rapid rate of change in Android makes many books quickly outdated.

- **Professional Android Sensor Programming** [$25 at Amazon and available free online from the NEU library]. Although dated, this is a strong resource for anyone interested in using sensors in mobile applications, and there isn't a more recent book on the topic. Excerpts from this book will be provided in the course materials.

Additional Required Materials

All development tools required to program in Android on PCs and Macs are freely available. Android Studio, which is free, will be the IDE used in the course. **Pay attention to the Android Studio hardware requirements.** Older versions of hardware or OS will seem to work at first, but it will cause problems with the emulator or compiling assignments later in the course.

A physical Android device is highly recommended. The emulator is painfully slow and buggy, and you will not get the full user experience and design possibilities with the emulator alone. The emulator does a very bad job of emulating the sensors (GPS, camera, tilt sensors, etc.). Many new or used devices are available at reasonable prices. You should have an Android device that is running Oreo (Android 8.0) or more recent. The emulator and a low-spec laptop are a bad combination.

Course Schedule

Course requirements include:

(1) Readings
(2) Individual and team design assignments
(3) Individual and team programming assignments
(4) The team programming project
(5) Recorded presentations of the team programming project

Week Date	Topic
1	Logistics, Intro to Tools, Hello World Android Basics, Debugging, Git
2	Activities, Activity Lifecycle, Tasks & Back Stack, User Engagement
3	Intro to the UI
4	Higher Level Mobile Design, Intent, the Manifest, RecyclerView
5	Threads, Broadcast Receiver, Services
6	Sensors in Android
7	Networking and Connectivity
8	Data Storage and Retrieval, Prototyping & Design Critiques
9	Firebase Realtime Database
10	Connecting to Other Devices
11	Software Optimization, Quality Guidelines
12	Preferences, Video & Audio Playback
13	Device IDs
14	Android Privacy, Final Projects

This will be an intensive course that will require significant reading each week, design exercises, discussion, and programming. Something will be due each week, except for the end of the course when groups are working on the projects. Students should be prepared to fully immerse themselves in Android programming and mobile app design and development for the semester. Group discussion and group development are important parts of the course, and students who desire to work alone will not find this course to be a good fit.

Students will be designing the apps that they build, not merely coding to a specification provided to them. You will be learning to figure out what is best for users who will use the app. Assignments will specify certain minimum functionality, but much of the structure and design of the app will be up to you. In other words, this course is about learning how to present information and controls to the user on a mobile device. You will have to figure out how to present the information in your app rather than being given a spec for how the information should be presented.

Students who are not comfortable in Java will most likely need to spend additional time becoming comfortable with Java syntax and libraries. If you are not comfortable with Java, please contact the instructor about whether you are ready for this course.

The syllabus and the schedule are subject to change.

Late Policy

Unexcused late assignments will automatically be lowered by one letter grade per day. **Assignments will not be accepted more than three days late**. Be sure to keep up with the discussions, as they will not re-open at the end of the semester when you realize that skipping them hurt your grade. They are designed to get you thinking about the topic for the week, so they are best done before you start the assignment for the week.

Academic Honesty

All students are expected and encouraged to discuss the topics raised by this course with each other. Ideas or content (including graphical content) incorporated from an outside source or another student must be documented appropriately in the app submissions, writeups, and presentations. Students must abide by the NU Code of Student Conduct and Academic Integrity Policy. Acts of academic dishonesty will be referred to the Office of Student Conduct and Conflict Resolution. Students are encouraged to help each other with programming assignments, **but copying of blocks of code from another student or team is not acceptable**. Students must be prepared and capable to explain the work they have done. Similarly, students working in teams are expected to jointly work on the code they develop and **ALL students should have a thorough understanding of all of the code**. Academic honesty is fundamental to the learning process. As a reminder, students are expected to present as their own only that which is clearly their own work in tests and in any material submitted for credit. Students may not assist others in presenting work that is not their own.

Write your own code and your own text. Don't copy from the Internet. Don't copy from other people. Don't copy from AI. We begin with simpler assignments because you are just starting the material, and it is important you learn the basics before moving to more advanced material that is not easily copied.

Purchasing term papers or coded applications from commercial firms or individuals is a serious violation of University policy. Offenders are subject to disciplinary action (Office of Judicial Affairs). Any member of the academic community who witnesses an act of academic dishonesty should report it to the appropriate faculty member or department chair (or equivalent). The charge will be investigated and if sufficient evidence is presented the case will be referred to the Northeastern University Student Judicial Hearing Board. Plagiarizing includes: representing someone's else's work as your own, insufficient acknowledgement, receiving or giving unauthorized help on choosing a topic, analyzing data, or drawing conclusions. Using the same paper or portions of a paper for two courses without explicit permission from professors of both courses. Any student found cheating on an assignment or with code that raises concerns about potential cheating will receive a zero on that assignment and be immediately reported to the Northeastern University Office of Student Conduct and Conflict Resolution (OSCCR) and the dean's office in CCIS. A second offense will result in a failing grade for the course. Note that even the suspicion of cheating will trigger these actions, and therefore students must actively work to prevent others from using their work in unauthorized ways.

Any code snippets or content used in any assignment throughout the class must be clearly documented in that particular assignment. Students with questions about what is acceptable or unacceptable collaboration on assignments should ask the instructor.

Other Resources

Students with Disabilities Accommodations*:* If you have a disability-related need for reasonable academic accommodations in this course and have not yet met with a Disability Specialist, please visit www.northeastern.edu/drc and follow the outlined procedure to request services. If the Disability Resource Center has formally approved you for an academic accommodation in this class, please present us with your **"**Professor Notification Letter**"** during the first week of the semester so that your specific needs can be addressed as early as possible. *Accommodations to assignments cannot be made without official notification from the DRC prior to the assignment's due date*.

Office of Institutional Diversity and Inclusion (OIDI): Northeastern University is committed to providing equal opportunity to its students and employees, and to eliminating discrimination when it occurs. If you have any concerns about bias acts or harassment, contact OIDI (http://www.northeastern.edu/oidi/). Please note that OIDI will make all reasonable efforts to maintain confidentiality whenever possible.

Title IX: Office of Gender Equality and Compliance provides support to all students exposed to any of claims covered by Title IX. Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources
here: https://www.northeastern.edu/titleix/