CPS 340: Mobile Application Development
Fall 2023

"Mobile phones are misnamed. They should be called gateways to human knowledge."

--Ray Kurzweil

Professor: Dr. Ed Novak *feel free to come to me with questions!*
email: *enovak@fandm.edu*   **Office:** *Stager 231*
Office Hours: Anytime by appointment and virtually via slack and email
          Wednesdays 4:00 – 5:30pm and Fridays 10:00 – 11:30am *(in person @ Stager 231)*

Course Description
This course will introduce you to writing applications for the Android platform. The purpose of this course is not to narrowly teach proficiency of Android "App" development, but rather to teach proficiency in learning how to develop applications on a platform that is new to you. Mobile applications on Android will merely serve as a vehicle to achieve this. A key part of the course is engaging with how to best contribute prudent and moral software in the modern world.

The objectives of the course can be laid out very broadly into three categories.

1) Improving Programming Skills
   • Solving practical, real-world problems on a modern computing platform (Android).
   • Expeditiously implement java programs, which extend existing classes and interfaces in elaborate OOP structures.
   • Debug and solve programming issues involved with event-driven (a.k.a callback driven) program structure.
   • Implementing multi-threaded applications that maintain responsiveness and usability.
   • Implement Android applications with a variety of basic and advanced APIs such as microphone, camera, GPS, "backend services", etc.

2) Professional Software Development
   • Create and evaluate application ideas based on the idea's aptitude for a target platform and it's impact on society.
   • Efficiently navigate official and unofficial documentation for the Android platform to find solutions to hyper-specific problems.
   • Synthesize code from disparate examples and effectively cite sources.
   • Finding, evaluating, and applying to post-graduation opportunities.
   • Explain and demonstrate proper usage of modern software development concepts such as agile development project management, git version control, and design languages.

3) Community Engagement (local and global, physical and virtual)
   • Work in teams to develop an Android application as specified by a third party, non-expert client.
   • Recognize and debate the merits of interesting ethical themes in the technology industry such as surveillance / tracking, tech addiction, depression and social media, etc.
   • Make contributions to open source software.
   • Discuss trends in the computer science industry. How does computer science impact society and the world?

Grading
Your final grade will be broken down based on the following weighted scheme:

Java Homework (1, Optional)	+1% *extra credit point*
Post Graduation Applications (50)	10%
App Implementations (3)	30%
Community Engagement App (1)	~~50%~~ 45%
In Class Activities	5%
Final Exam	10%

Grading and Interactions With The Instructor
In this course you are ***more responsible*** than usual for determining what is necessary for you to earn a good grade on what you submit. The best way to do this is to submit materials which are professional and high quality in their presentation. The second best way to do this is to meet with me regularly to get constructive criticism. Often I will likely show you what you need to learn or improve, as opposed to teaching you material directly in office hours. **My goal is for you to come to know what qualifies as "high quality" without being told directly and for you to succeed!**

I expect you to start work on assignments the day they are assigned. If you start early, you should have ample time to encounter road-blocks and either think them through, or get help at office hours. **Do not wait until the last day to begin your homework.**

FREE GIFT: You may submit one assignment up to **48 hours late** without penalty by using your "free gift." It is not necessary to notify me explicitly that you are using your free gift. I will assume that is the case whenever you submit anything late. Of course, you can only use your free gift once. Submissions made late using your free gift may not be graded or receive feedback as quickly as on-time submissions.

You can submit or "pre-submit" your homework *multiple times with no penalty* assuming you do so before the deadline. You can also submit and ask me to "validate" the submission. At my convenience I will perform a superficial check that your homework appears to be submitted correctly.

Unexpected Emergencies and Extenuating Circumstances (Life)
When there are significant life disruptions, I will do my best to afford you leniency and provide special accommodations within reason. As a rule of thumb, I cannot give you credit for things which you have not done. I recommend you start assignments early as insurance for yourself that, should something disrupt your life, you can successfully complete assignments. Your free gift is in place to help you account for such unexpected life events.

Devices and Development Kit
You are encouraged to make use of your own personal devices to develop apps in this class including Android smartphones, iOS smartphones, as well as any personal computers you might have. For your convenience and to support your learning, the CS department will provide computers properly configured to write Android apps (those in Stager 002, 029, and 006) and the department will provide

various models of Android smartphones to test Android apps on. The CS department will also provide a limited number of Apple "macbook" laptops and iPhones to write and test iOS apps, which are optional for this class.

Devices will be "checked-out" and while they are in your possession they are your technical and financial responsibility.

Homework
The "only homework assignment" is an optional Java assignment. It is worth 1% extra credit. The assignment is assigned and due at the beginning of the term, but the 1% EC point is calculated at the end of the course.

Post Graduation Applications
What are your plans after you graduate from F&M? Finding your next engagement is hard and it can be scary! The purpose of this assignment is to face the challenge head-on and to provide the motivation to actually search and apply for opportunities. You will be required to apply to high-quality professional opportunities on a weekly basis throughout the class. Examples include internships, scholarships, jobs, and graduate schools.

Individual App Implementations
You will be given three applications to recreate. The first is a calculator app, the second is a microphone app, and the third is an English-word based game similar to the popular "wordle" which went viral in late 2021. These assignments each are scheduled over two weeks. I encourage you to start early and to meet with me regularly to get feedback while working.

Community Engagement Project
The most substantial content of this course is the final project in which students will be assigned to groups of four and build an application according to the direction of a third-party non-profit local community organization. The project is released at the midway point of the course and runs until the last day of course at which time the groups will present their work. In the past organizations such as The Boys & Girls Club of Lancaster, and the Ronald McDonald House Charities of Central, PA have been participants.

This project requires the earnest participation of all involved especially the outside organizations. In years when this project is not feasible, due to lack of these organizations, personal projects will be created and designed by the student teams. In all outcomes, the applications produced by the student teams should strive to be a "net-good" contribution.

Final Exam
There will be a final exam, which will be scheduled by the registrar and announced in class. If you have scheduling conflicts please let me know as soon as possible so alternative arrangements can be made.

If You Have Questions or Need Help
Please seek out help if you are confused or have questions! You can message me via Slack, or email <u>at any time of day</u>. I will try to respond as soon as reasonably possible, although I never guarantee a response before an impending deadline. Please attend my office hours. Please ask questions in class (this is a flipped classroom model!). In addition, the Q&SC tutors will hold evening help sessions. **The goal is for you to succeed!**

Accessibility
At Franklin & Marshall College, one of our goals is to create an accessible learning environment for all students. If you anticipate or experience a barrier based on a disability, such as a learning disability, mental health concern, or mobility impairment, please contact the College's Office of Student Accessibility Services (SAS) in order to establish reasonable accommodations per College policy. Please note that accommodations are not retroactive and require advance notice to implement.
SAS contact information:
Dr. Alison Hobbs, ahobbs@fandm.edu Phone: 717-358-5988
931 Harrisburg Avenue College Square Building, 2nd floor

Cheating and Academic Honesty
As stated in the college catalog (p. 117), you are expected to be honest and forthright in representing your work and its origins. In this class you are encouraged to learn from and support your peers and to independently seek out resources online to learn and remember implementation details. In this class, the programming work is more about synthesizing existing code examples as opposed to writing code "from scratch."

- <u>All support and reference material **must be cited** via comments in your source code</u> including website articles, tutorials, AI agents (such as GitHub Copilot or ChatGPT), sophisticated code-auto-complete tools, classmates, friends, family, personal contacts, etc.

- Under appropriate circumstances I am happy to provide an extension on the assignment deadline to avoid academic dishonesty.

Situations of academic dishonesty will result in (a) a report to the Dean of Students, Collette Shaw (b) a conversation with the instructor, and (c) a grade reduction. The grade reduction may be zero for the relevant assignment, a letter reduction of your final course grade (e.g. B+ becomes C+), or an automatic failing grade in the course.

Repeat or egregious offenses will receive a failing grade in the course.

Mandatory Reporting of Sexual Misconduct Policy
Franklin & Marshall College is committed to creating a safe and open learning environment for all students. If you or someone you know has experienced sexual harassment, including sexual assault, dating or domestic violence, and stalking, please know that help and support are available. F&M strongly encourages all members of the community to take action, seek support, and report incidents of sexual harassment to the Title IX Office. You may contact the Title IX Coordinator, Kate Buchkoski, Ph.D., at kate.buchkoski@fandm.edu or 717-358-7178 or learn more by visiting the College's Title IX website. Please be aware that all employees, including faculty members, are mandated reporters and

are required to disclose information about suspected or alleged sexual harassment to the Title IX Offic. If the Title IX Office receives information about an incident, the Title IX Coordinator will reach out to offer information about resources, rights, and procedural options as a member of the campus community. If you, or another student you know, wishes to speak to a confidential resource who does not have this reporting responsibility, the following on-campus options are available:

Student Wellness Center: (717) 544-9051, College Square
Counseling Services: (717) 544-9051, College Square

The YWCA is a local, off-campus confidential resource and can be reached via their 24-Hour Sexual Assault Hotline: (717) 392-7273. For questions about the mandated reporter policy or any sexual misconduct issue, you may contact the Title IX Coordinator, Kate Buchkoski, Ph.D. at kate.buchkoski@fandm.edu or 717-358-7178. Policies and additional information can be found on the Title IX webpage (**https://www.fandm.edu/campus-life/title-ix**)

Course Schedule

Week #	Lecture Content	Assignment Content
1 *(Aug. 30th)*	Syllabus and course overview	Optional Java HW Released
2 *(Sep. 4th & 6th)*	Developing for a Platform & Polymorphism in Java	
3	Advanced Java Polymorphism	
4	"Hello, World!" Android & Follow-Up Lab (hello world, event driven arch., view layouts, adb)	App 1 HW Released (calculator)
5 *(Sep. 25th & 27th)*	Android Core Part 1 (activity lifecycle, toast, layouts, logcat, vibration API, arrayadapter, basic permissions)	
6	Android Core Part 2 (menus, file I/O, drawables, images, permissions, GPS API)	App 2 Released (microphone) Post Grad Applications Released
7 *(Oct. 11th)*	Microphone Work Day	Fall Break
8	Professional Communication Etiquette (visit from Lisa Wolfe) Community Engagement (CE) Project Released, Teams Formed, Projecting Bidding Day Android & Git + GitHub	Project Proposals due next Monday
9	Android Core Part 2 Wrap-Up (Location APIs) Android Core Part 3 (advanced layouts, basic animations, AsyncTask, Threads)	App 3 Released (wordly)

10 *(Oct. 30th & Nov. 1st)*	Work Day / Stand-up Check-in Meetings	C.E. Midway Check Due Oct. 30th (reviewed in class Nov. 1st)
11	Android Core Part 4 (networking, discussion, wordly HW help) Work Day / Stand-up Check-in Meetings	
12	Android API: Firebase Android API: Viewpager2 & TabLayout Agile Development Work Day / Stand-up Check-in Meetings	C.E. Midway Check
13 *(Nov. 20th)*	UI / UX crash course Discussion(s) (smartphone addiction) Work Day / Stand-up Check-in Meetings	Thanksgiving Break
14 *(Nov. 27th & 29th)*	Discussion(s) (privacy, ethical eng.) Android API Misc.: WebView, Share, Implicit Intents Progress check-ins for CE Projects Work Days F-Droid Open Source Day Android API: Camera (sensors, representing data, model:view arch, fragments)	
16 *(Dec. 4th & 6th)*	CE Presentations	CE Project Due at 4:30pm **Friday Dec. 8th**