Mobile Application Development (Android)

Are you interested in learning mobile app development?
Do you have an app idea that you would like to get started on?
Do you want to submit an app to Google Play?
Do you want to be a mobile entrepreneur?
If you answered "yes" to any of these questions, then this course is for you!

Prerequisite: Java

Description:

This course surveys the specificities of quality native applications development for the Android platform. The software engineering aspects of mobile application development, including user-centered design (UX), testing and quality assurance, will be emphasized throughout the course. Students will learn how to design and develop applications for the Android platform, as well as some of the best practices used in the industry. The following topics will be covered: activities, fragments, intents, content providers, views, XML, notifications, real-time databases with Firebase, rich and responsible layouts, location-based services, Firebase, SQLite, recycle views, and multi-threading network / web access. The course will cover Java, first, and then Kotlin, the new language for Android development privileged by Google. A project with presentations is integrated in the course.

Objectives:

After taking this course, students should be able to:

- Have deep technical knowledge of Android development;
- Develop and maintain high-quality mobile software products;
- Appreciate the importance of user-centered design, testing and quality assurance in developing mobile software products;
- Understand the software engineering process to develop mobile software products (Agile and Scrum in particular);
- Understand the specifics and constraints of developing for mobile platforms;
- Feel comfortable taking an application from the ideation phase to completion;
- Have knowledge of conferences and events for mobile developers and entrepreneurs locally and internationally.

Software:

Software include Android SDK, Android Studio, Firebase, GitHub, Git, Google Docs, Slack and HackerRank.

Hardware:

Android Phone (Jelly Bean or higher). Although students can develop apps using the Android emulator, **it is mandatory that they have their own Android phone to develop on. So-called "Chinese" phones do not support Android development.**

Course format:

- *HackerRank:* At the beginning of the course, students will test their Java skills using HackerRank, a platform used by recruiters worldwide (e.g., Amazon, Google, Facebook).
- *Lectures and labs:* Lectures will generally consist of PowerPoint presentations, with in-class activities and discussions dispersed throughout. There will be code walkthroughs to apply knowledge. The course is highly practical.
- *Quizzes:* Quizzes will be periodically administered (sometimes without warning!) to evaluate the students' understanding of the material.
- *Assignments:* Programming assignments will require students to deliver apk files and code in GitHub. They will be tested and reviewed by another student with oversight from the professor.
- *Midterm:* The course includes a midterm. It will include a written part and a programming part.
- *Project:* The course integrates a team project and a presentation on the last day of class. Several presentations will happen throughout the course.
- *Slack:* Students can ask questions in the Slack communication platform configured for the course. Students are encouraged to answer the questions of their classmates. Students must observe netiquette in the discussions.
- *Emails:* Emails to the professor should have Bambey in the title and be followed with the purpose of the email. If students raise an issue they face, they should add clear explanations, screenshots and videos. Slack is preferred to emails.
- *Meetups:* Students will be encouraged to attend meetups in Senegal.
- *Software Engineering:* Students will go through all the phases of the development of mobile solutions: requirements, design, development, and quality assurance. Industry tools will be emphasized – Git, GitHub… etc – and methodologies – Scrum, Agile etc.

Course information:

When & Where: Face-to-face
Instructor: Dr. Christelle Scharff
Email: scharffc@gmail.com
URLs: http://www.csis.pace.edu/~scharff
https://github.com/scharffc

Textbooks:

- No textbook is required.
- Android Developers | Getting Started - https://developer.android.com/training/index.html
- Google Codelabs https://codelabs.developers.google.com/
- Ray Wenderlich | Android Development Tutorials - https://www.raywenderlich.com/category/android
- Android Asset Studio - http://romannurik.github.io/AndroidAssetStudio/
- Material Design - https://material.io/
- Material Design Icons - https://materialdesignicons.com/

Additional materials and recommended readings will be assigned during the course. As Android is evolving rapidly, books are quickly outdated.

Policy:

The following policies will be strictly enforced:

- *Course Documents:* All material will be posted online in GitHub. It is students' responsibility to download such material. https://github.com/bambey2019
- *Assignments:* Late assignments are not accepted, except special situations.
- *Emails & Announcements:* It is students' responsibility to read emails and consult announcements in Slack regularly.
- *Software:* Students will be responsible of installing and configuring different software in this course. It will take patience! Students should use the web and StackOverflow for assistance. **Software must be installed before the course starts.**
- *Course Grades:* You will be assessed on homeworks (30%), quizzes (25%), a midterm (15%), and a team project (30%).

Academic Integrity: All students taking the course are expected to behave with honesty and integrity.

Calendar:

Preparation	Installing the software will take TIME. Consider ONE DAY using a "correct" internet connection. Laptop requirements: 3 GB RAM **minimum**, 8 GB RAM recommended; plus 1 GB for the **Android** Emulator. 2 GB of available disk space **minimum**, 4 GB Recommended (500 MB for IDE + 1.5 GB for **Android** SDK and emulator **system** image) 1280 x 800 **minimum** screen resolution. See here for more information: https://developer.android.com/studio	
	Installation of Android Studio	https://developer.android.com/studio/install
	Update of Android Studio	https://developer.android.com/studio/intro/update Install all SDK up to Android 4.4 KitKat
	Run your app on a device	https://developer.android.com/studio/run/win-usb Install the USB driver if necessary
	Kotlin on Eclipse	Install Kotlin https://kotlinlang.org/docs/tutorials/getting-started-eclipse.html
	Java	Be sure that Java SDK is installed
	GitHub	Create a GitHub account and post it here with the required information (see the sample): http://bit.ly/bambeymboile2019
	Slack	Join http://bit.ly/bambeyslack

5 hours per day
The schedule may change without prior notice.

Week	Day	Date	Topics	#hours	Homeworks and quizzes
Week1	Wednesday	27/11	Introduction Slack Git / GitHub Overview of Android Studio Review of Java	5	Slack Git / GitHub GitHub exercise
	Thursday	28/11	HackerRank Hello World in Android UX Material design UI components Images Java patterns in Android	5	
	Friday	29/11	More UX components Intents Agile methodologies and Scrum – XP Scrum Game	5	CodeLabs homeworks
Week 2	Monday	2/12	AsyncTask Design thinking	5	
	Tuesday	3/12	RecycleView and other lists Project – Overview	5	Quizz
	Wednesday	4/12	SQLite Firebase	5	CodeLabs homeworks
	Thursday	5/12	Maps Mobile entrepreneurs in Senegal Business Canvas Model Project - Ideation and brainstorming on the project	5	
	Friday	6/12	Kotlin – The language Project – Risk Management, Backlog and Design	5	
Week 3	Monday	9/12	Android Kotlin – UI / UX	5	Kotlin

			Project – Teamwork		exercises Quizz
	Tuesday	10/12	**NO CLASS**		
	Wednesday	11/12	Android Kotlin – Accessing the internet Project – Apply Agile and Scrum	5	Project idea, team and GitHub Codelabs homeworks
	Thursday	12/12	Android Kotlin – Maps Project – Presenting and pitching your idea Google Docs	5	Presentations
	Friday	13/12	Android Kotlin – SQLite et Firebase Project – Quality Assurance and Google Play	5	Quizz Presentations

Exam:

An exam will be organized after 13/12.

Project deadlines:

The presentation of the project will be organized on 6/1.This can change!

- Sprint 1 – 13/12 au 20/12
- Sprint 2 – 20/12 au 27/12
- Sprint 3 – 27/12 au 3/1
- Final presentation: 6/1