

14:332:453 Mobile App Engineering and User Experience

Course Catalog Description:

This class teaches essential principles, techniques, tools, and methods for designing and implementing robust mobile applications and user experiences. Students work in small collaborative design teams to propose, build, and document a project focused on mobile applications for (Android) mobile phones. Additional assignments include creating several small mobile applications such as context-aware applications. Students document their work through a series of written and oral proposals, progress reports, and final reports. Covers the basics of Android programming, cell phone localization, energy-efficiency, prototyping, security, user-centered design, and usability testing.

Pre-Requisite Courses:

[14:332:351](#) or equivalent knowledge

Pre-Requisite by Topic:

1. Java Programming Methodology
2. Data Structures and Algorithms
3. Familiarity with Operating Systems

Textbook & Materials:

Mednieks, Dornin, Meike & Nakamura, "Programming Android: Java Programming for New Generation of Mobile Devices", O'Reilly, October 2012

References:

[TBD] e.g. Prototyping with Tiny Fingers

Overall Educational Objective:

To introduce students to the development of mobile computing software and applications using Android as a reference platform and introduce mobile computing concepts from a programmer's perspective. To create a foundation for further study and professional practice in mobile software development.

Course Learning Outcomes:

A student who successfully fulfills the course requirements will have demonstrated:

1. An ability to develop both user-oriented and systems-oriented Android programs.
2. An ability to conduct user-centered design for mobile applications.
3. An ability to understand programming constraints with mobile platforms. Understanding how different program hierarchies affect energy-efficiency, user experience and security.
4. An understanding of the Android programming models and development tools.

How Course Outcomes are Assessed:

Practical home work assignments, midterm, final project

N = none S = Supportive H = highly related

Outcome	Level	Proficiency assessed by		
(a) an ability to apply knowledge of Mathematics, science, and engineering	H	HW Problems, Exams		
(b) an ability to design and conduct experiments and interpret data	S	Design problems in HW and Exams		
(c) an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	H	Design and implementation problem in project and Exams		
(d) an ability to function as part of a multi-disciplinary team	S	not assessed		
(e) an ability to identify, formulate, and solve ECE problems	H	HW Problems, Exams		
(f) an understanding of professional and ethical responsibility	S	Class Discussions		
(g) an ability to communicate in written and oral form	S	HW Problems, Class Discussions		
(h) the broad education necessary to understand the impact of electrical and computer engineering solutions in a global, economic, environmental, and societal context	N			
(i) a recognition of the need for, and an ability to engage in life-long learning	S	Lectures, subsequent classes		
(j) a knowledge of contemporary issues	H	HW Problems, Exams		
(k) an ability to use the techniques, skills, and modern engineering tools necessary for electrical and computer engineering practice	H	Project work		
Basic disciplines in Electrical Engineering	N			
Depth in Electrical Engineering	N			
Basic disciplines in Computer Engineering	H	HW, Exams		
Depth in Computer Engineering	H	HW, Exams		

Laboratory equipment and software tools	H	Android, Android emulator, Android SDK, Eclipse.	
Variety of instruction formats	S	Lectures, Laboratory problem sessions, Office hour discussions	

Topics Covered in Classes:

Class 1: Course Introduction; Mobile Applications and Android Overview

Class 2: Android Programming Environment

Class 3: Qualitative Data Analysis / Android Fundamentals

Class 4: Mobile Design / Paper Prototyping

Class 5: Mobile Location / Networking

Class 6: Security

Class 7: Energy-Efficiency

Class 8: Field Evaluation

Class 9: Final Project

Computer Usage:

Use of Android in homework assignments and exams.

Laboratory Experiences:

All homeworks and exams require use of the computer laboratory.

Design Experiences:

~80% Homework problems are design-oriented problems, which require students to design and implement computer programs that meet specified requirements.

~80% problems in the Exams are design related.

Independent Learning Experiences :

1. Computer Programming Home-Work, 2. Testing (Quizzes, Exams)

Contribution to the Professional Component:

(a) College-level Mathematics and Basic Sciences: 0.0 credit hours (b) Engineering Topics (Science and/or Design): 3.0 credit hours (c) General Education: 0.0 credit hours Total credits: 3

Prepared by: J. LINDQVIST

Date: February, 2014