CEN 4214 - Software-Hardware CoDesign

Fall 2014

Course Syllabus: This is a classroom lecture course with a component of team-based application development. Students, typically from CE and CS, works in groups of 2.

Note: Students registered for another course on smart sensors may also join such groups.

Text: Professional Android Sensor Programming, by G. Milette and A. Stroud, Wrox

Reference (and Text book for the electrical engineering group): Rapid Android Development: Build Rich, Sensor-Based Applications with Processing, Daniel Sauter, The Pragmatic Bookshelf, 2013, ISBN-13: 978-1-03778-506-2

Pre-requisite: Java and XML

Instructor: Ravi Shankar, Professor and Director, CSI, CEECS

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Office Hours: 9 AM to 3 PM Friday

Course Time and Place: MWF 2 to 2.50 PM, EE 207 for MW. Note: Friday’s class will be on-line through Blackboard.

Course Description: This course is designed to help students develop and prototype Android-based mobile applications. Java and the Nexus 7 Tablet are used in designing and prototyping. The current semester’s focus is on sensor and actuator integration in Apps. Apps may be information gathering, game oriented, and/or analytical for decision making. Note: This class will run concurrent to an undergrad course for electrical engineering majors. Though both will get exposed to two programming languages and algorithmic/analytical techniques, the CS and CE students will focus on Java and web aspects of App development. App development will be a collaborative effort between the two groups. (EE students will focus more on the Processing language, analog and digital signal processing, and mathematical aspects in their App development).

SDK kit and emulation will be used initially in the course. Nexus 7 tablets supporting Android 4.3 are available for app development

Grading: 3 class/take home quizzes 30% (on sensors in lifecycle and fragments, open GLES, and GoogleMap); 2 Exams 10% (7th week) and 10% (finals week); 1Team (2/3 member) presentation - book Apps 20%; Study and prototype a Museum App 20%; and Document and 10%

Topics to cover (chapters may get covered out of sequence)

1. Android Introduction: High level Android Overview; Installing the Android SDK and other Plug-ins (Java and Eclipse environment)
2. Location Based Sensors - Chapters 1 to 4/ Text
3. Physical Sensors and Information - Chapters 5 to 9/ Text
4. Android Open Accessory - Chapter 10
5. NFC, Camera, and Image Processing - Chapters 11 to 13.
6. (If time permits): Speech Apps and Speech Activation - Chapters 14 to 18.