Course: EE PMP 590
Title: Mobile Applications for Sensing and Control
Credits: 4
Course Web Site: TBA

Course Description: This class will equip students with the practical skills necessary to develop mobile applications able to take advantage of the myriad sensing and control capabilities that modern smartphones offer. The course will focus on interfacing with the hardware of the phone and efficient computing both on the phone and in the cloud, using virtualized servers. A third-party hardware platform will interface with the mobile platform and allow students to integrate realtime control with the sensing learned earlier in the quarter. Assignments will use both the C# and C++ programming languages, therefore a background in Object-Oriented programming is encouraged. Students will design and construct a final project in groups of 2-3, and will demo their final project at the end of the quarter. The course grade will be based upon weekly homework assignments throughout the quarter, and the final project presentation and report at the end of the quarter. Final project presentations will be conducted over the last two weeks of the course (including finals week) where lecture time will be split between special topics/guest speakers and student groups giving short demonstrations and presentations of their final project.

Lecture Time: Th 6:00–9:50 pm in EEB 045, with a break at 7:20–7:25 pm.
Instructor: Elliot Saba (CSE 507, sabae@uw.edu)
Office Hours: TBA

Teaching Assistant: TBA
TA Office Hours: TBA

Homework: Weekly homework will be submitted electronically to the TA no later than 6:00 pm at the start of lecture. Homeworks will take the form of an application specification that students will need to individually implement. Late Homework will not be accepted. Note that all software needed to finish the homework is freely available for download online), however without a phone students will need to be able to run the Phone Emulator on their computers which has certain system requirements. This will be discussed in class, and during the discussion/lab sessions following each lecture.

Final Project Demonstration: Over the last two weeks of class (including finals week), each student group will give a short presentation summarizing their project and demonstrating it to the rest of the class and the Instructor/TA. Students will be graded on difficulty of project, successful integration of class concepts into the final project, and most importantly functionality of final product.

Hardware/Software: To work on the homeworks and final projects, students will need access to computers running Windows 8 and Visual Studio 2012 or newer. A limited number of Windows phones will be provided to the class by Microsoft and returned at the end of the quarter. For those students unable to effectively share a phone with a team, due to work obligations or travel concerns, a separate windows phone is required to be purchased.

Course Grading:
- Attendance: required, with up to 2 absences allowed.
- Weekly Homeworks: 50%
- Final Project Demo and Report: 50%

Week(s)	Topic (subject to change)
1	**Introduction** Overview of Windows Phone 8 Platform Basic User Interface Programming
2,3	**Sensing** Introduction to interfacing with hardware Audio In/Out, reading from GPS, Gyroscope and Accelerometer Begin computation discussion via simple 1-d filtering
4	**Sensing/Computation** Image capturing via the camera Simple real-time image processing Introduction to profiling and debugging
5-6	**Control** Discuss Bluetooth/USB control Realtime communication with 3rd party hardware Simple "controller" design
X	**Project Planning** At this point, students will need have divided into teams of 2-3 and submitted a brief project proposal to the TA
7-8	**Cloud Computation** Discuss advantages of Cloud Computation Utilize Cloud Computation for Speech Recognition, etc.
9-10	**Special Topics/Project Presentations** Special topics/Guest Lecturers For the last two weeks of class, students will present their finished projects