CS 33301    Embedded System Programming    3 credit hours

Instructor’s Name: Jong-Hoon Kim

(Textbook Title, Author, Year)  
No Textbook is required, but selected textbook sections will be handout or electrically available. In addition, open source hardware/software projects will be introduced and students will use them for their own project. All class readings are based on materials available from electronic sources or provided by Instructor on a weekly basis

(Other Supplemental Material)  
[Recommended texts for your references]  
− Physical Computing: Sensing and Controlling the Physical World with Computers 1st Edition,  
  O’Sullivan and Tom Igoe  
− Arduino Cookbook, 2nd Edition,  
  Michael Margolis,  
  O'Reilly Media.  
− Making Embedded Systems: Design Patterns for Great Software 1st Edition  
  Elecia White  
  O'Reilly Media  

Course Content:  
Embedded system is combination of computer hardware and software for specifically designed for a particular function. Embedded systems has been playing important roles in various application areas such as Industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines, toys and other uses embedded system. Students will learn fundamental concepts of designing and programming embedded computer systems, including requirements specifications, architectural and detailed design, and implementation, focusing on real-time aspects of programming languages, operating system kernels, and hardware architectures.

Prerequisites or co-requisites:  
special approval.  
C or better in CS 13001    Computer Programming  
C or better in CS 23001    Data Structure  
Required, elective, or selected elective
Goals:

Outcomes:

By strong growth of those markets, a huge number of embedded system experts are highly expected. This course will provide essential knowledge as well as special experience to students who will fulfill the requirements on those fields.

Students completing this course will
• learn the theoretical & practical base for embedded system programming
• become familiar with embedded system applications
• acquire the ability to present engineering designs
• deepen the knowledge of the embedded system and their components
• understand design trade-offs and take design decisions
• Hand-on-experience with practical examples and projects using real hardware and embedded system programming (Arduino)

Topics to be Covered:
• Introduction to Embedded System
• Basic Electricity
• Circuits
• Microcontroller
• Programming
• Computer Interface
• Sensing & Filtering
• Acting & Control
• Device Communication
• Timer & Interrupt
• Memory Handling & User Library