1. ES430 Embedded Microcontroller System Integration

2. Credits and contact hours: 2-2-3

3. Instructor: Prof. Edwin Zivi

4. Textbook: Course notes

5. Specific course information
   a. This course builds on previous Systems Engineering computer course work to extend embedded micro-controller software and hardware integration skills. Following reinforcement of software design and programming, the Dynamic C debugger is introduced. Two fundamental new skills are introduced and developed: (1) writing software which directly configures and communicates with Rabbit 3000 internal and external hardware and (2) interrupts and event driven software development.
   b. Prerequisites: ES202
   c. Course is Systems Major elective and is part of the Embedded Computer Concentration

6. Specific goals for the course
   a. Direct software configuration and control of internal microcomputer resources including I/O ports, external interrupts and timers
   b. Event driven Interrupt Service Routine (ISR) programming
   c. Online debugging features of the Dynamic C integrated development environment

7. Brief list of topics to be covered
   a. Embedded Processing Intro
   b. Dynamic C Language Review
   c. Embedded Computer Architecture & Organization
   d. Rabbit 3000 microcontroller and ES430 Single Board Computer
   e. Binary Symbols & Number Representations
   f. Internal Parallel I/O
   g. Shifting and Masking Fundamentals
   h. Software requirements, Design & Pseudo-code
   i. Pseudocode to C code
   j. Software Engineering Design
   k. Interrupts, Interrupt Service Routines, External Interrupts
   l. Timers, Timer Chains, Timer Interrupts
   m. Pulse Width Modulation / Pulse Code Modulation
   n. Asynchronous Serial Communications
   o. Synchronous Serial Communications
   p. A/D Conversion & Applications
   q. Input Capture Module / Sonar Ranging