

NEWARK COLLEGE OF ENGINEERING

SYLLABUS AND COURSE INFORMATION

- Course Name:** Embedded Systems II
- Course Number:** ECET 411
- Course Structure:** 2-2-3 (lecture hr/wk – lab hr/wk – course credits)
- Course Description:** This course is the second of two embedded systems courses. The primary objective is to prepare students in the ECET curriculum to design embedded systems as part of senior project and also in industry. The design of embedded systems is investigated at the hardware and software level with an emphasis on processor and system architecture. The C language is used for programming.
- Prerequisites:** ECET 311 and ECET 365
- Corequisites:** None
- Required, Elective, or Selected Elective:** Required
- Required Materials:** **Text:** Name: The AVR Microcontroller and Embedded Systems
Author: Mazidi, Naimi, Naimi
Year: 2010
ISBN: 978-0-13-800331-9
- Course Outcomes:** By the end of the course students are able to:
1. Decide on the type of embedded system suitable for a given application.
 2. Develop firmware to control external hardware, external ICs, and external human interface devices.
 3. Explain the characteristics of a microcontroller and how it compares to a microprocessor.
 4. Explain the relationship between hardware and software and how they work together to accomplish a task.
 5. Interface embedded systems to the mostly analog outside world making use of timers, input capture/output compare, PWM, A/D, serial and parallel ports, and interrupts.
 6. Use an Integrated Development Environment, an Evaluation Board, and various other tools for project design, troubleshooting, and debugging.
 7. Analyze a flow chart and hardware schematic to deduce the operation and functions of a microcontroller/embedded system.
 8. Design a microcontroller/embedded system from a real-life problem statement.
 9. Work in teams of two or three students and maintain a lab notebook

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Class Topics: Embedded Systems Analog to Digital Converters
C Programming Language Timers and Counters
Interrupts Pulse Width Modulation
Serial Interfaces Flow Charts
LCD Interfacing Hardware Schematics

Student Outcomes: The Course Learning Outcomes support achievement of the following Student Outcomes from the ETAC of ABET Criterion 3 requirements.

Student Outcome d: An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives.

Related Course Learning Outcomes: 1, 5, 6, & 8

Student Outcome e: An ability to function effectively as a member or leader on a technical team.

Related Course Learning Outcomes: 9

Student Outcome f: An ability to identify, analyze, and solve broadly-defined engineering technology problems.

Related Course Learning Outcomes: 8

Student Outcome i: The application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers, and engineering standards to the building, testing, operation, and maintenance of electrical/electronic(s) systems.

Related Course Learning Outcomes: 1, 2, 6, & 8

Academic Integrity: NJIT has a zero-tolerance policy regarding cheating of any kind and student behavior that is disruptive to a learning environment. Any incidents will be immediately reported to the Dean of Students. Please visit the Dean of Students website at <http://www.njit.edu/doss> for a list of student policies relating to academic integrity and student conduct.

Modification to Course: The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course Outline.

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