New Jersey Institute of Technology
University Heights
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Department of Engineering Technology
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NEWARK COLLEGE OF ENGINEERING

SYLLABUS AND COURSE INFORMATION

Course Name: Embedded Systems I

Course Number: ECET 311

Course Structure: 2-2-3 (lecture hr/wk – lab hr/wk – course credits)

Course Description: Develops a working knowledge of the characteristics and applications of devices used in embedded systems such as microcontrollers. Emphasis is put on the architecture, instruction sets, and assemblers. Representative data handling problems and interfacing are studied and tested in the laboratory using state-of-the art hardware.

Prerequisites: (CS 100 or CS 106 or CS 113 or CS 114 or CS 115 or CS 116) and (ECET 211 or CPT 315 or ECE 252) and (ECET 215 or ECE 251) and (ECET 205 or ECE 271)

Corequisites: None

Required, Elective, or Selected Elective: Required

Required Materials: **Text:** None. Students may be required to buy embedded systems hardware, sensors, and devices for use in personal lab experiments and projects.

Course Outcomes: By the end of the course students are able to:

1. Convert numbers from one numbering systems to another.
2. List and describe the fundamental parts of a microcontroller and explain the difference between a microcontroller and a microprocessor.
3. Understang the relationship between hardware and software and how they work together to accomplish a task.
4. Develop high level code and hardware solutions to embedded problems and tasks.
5. Use hardware peripherals such as timers, PWM, A/D, serial, IO ports, and interrupts to develop robust and full-featured microcontroller programs.
6. Utilize an Integrated Development Environment and a development board to assist in project design, troubleshooting, and debugging.
7. Develop and analyze flow charts and hardware schematics to deduce or describe the operation and functions of an embedded system.
8. Synthesize an embedded system and program from a real-life problem statement.
9. Develop engineering specifications for a design and present them in a oral and written project report.

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Class Topics:

Microcontrollers	Embedded Systems
Numbering Systems	Assembly Language & Instructions
Interfacing, I/O, & Delays	Flow Charts
Schematics	

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

Student Outcome 1: An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline.
Related Course Learning Outcomes: 2 and 3

Student Outcome 2: An ability to design systems, components, or processes meeting specified needs for broadly defined engineering problems appropriate to the discipline.
Related Course Learning Outcomes: 7 and 8

Student Outcome 3: An ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature.
Related Course Learning Outcomes: 9

Academic Integrity: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

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.

Prepared By: Daniel Brateris

Course Coordinator: Daniel Brateris **Updated:** 11 March 2023