The University of Texas at Tyler  
Department of Electrical Engineering  

EENG 3307: Microprocessors (required)  

Syllabus  

Catalog Description:  
EENG 3307: Microprocessors  
Microprocessor architecture, programming and interfacing. Introduction to assembly language programming; Microcomputers, microcontrollers, instruction set, chip interfacing, addressing modes, interrupts, input/output, communication. Three hours of lecture per week with integrated laboratory sessions. Prerequisites: EENG 3302 and COSC 1336 and COSC 1136  

Prerequisites: EENG 3302 - Digital Systems, COSC 1336/1136 – Programming  

Credits: (3 hours lecture, 0 hours laboratory per week)  


Additional Material: Motorola 68HC11 Development Board. Laboratory projects are integrated to provide students with hands-on experience.  

Course Coordinator: Mukul V. Shirvaikar, Professor  

Topics Covered:  
Microcomputer Fundamentals: number systems, codes, digital circuits, memory devices, and introduction to computers; Microprocessors: elements, structure, operation, memory, bus architecture, and instruction set; Microcomputer Programming: assembly language, arithmetic operations, decisions, loops, tables, lists, subroutines, and interrupts; Microcomputer Interfacing: input/output modes, serial and parallel interfaces, synchronous and asynchronous communication.  

Evaluation Methods: (only items in dark print apply):  
1. Examinations / Quizzes  
2. Homework  
3. Report  
4. Computer Programming  
5. Project  
6. Presentation  
7. Course Participation  
8. Peer Review  

Course Objectives: By the end of this course students will be able to:  
1. Convert numbers between decimal, hex and binary number systems, and perform arithmetic in twos-complement notation. [1,2]  
2. Identify the functional components of a microprocessor and microcontroller. [1,2]  
3. Explain the instruction fetch-decode-execute cycle timing and internal operation. [1,2]  
4. Design address decoding schemes for the microcontroller memory map using
memories and logic components like decoders and tri-state buffers. [1,2]
5. Write, assemble, load and run an assembly language program. [1,4,5]
6. Analyze, test and debug an assembly language program or code segment. [1,2,4,5]
7. Determine addressing modes and processor condition codes for instructions. [1,4].
8. Design input-output interface solutions utilizing general purpose I/O, interrupts and timers. [1,2,4,5]
9. Implement a microcontroller application using peripherals like the ADC including combined hardware/software debugging. [4,5]

*Numbers in brackets refer to method(s) used to evaluate the course objective.

Relationship to Program Outcomes (only items in dark print apply)*: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering; [1-9]
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering; [1-9]
3. have the ability to analyze electrical circuits, devices, and systems; [1-3]
4. have the ability to design electrical circuits, devices, and systems to meet application requirements; [1-3]
5. have the ability to design and conduct experiments, and analyze and interpret experimental results; [1-9]
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods; [1-3]
7. have effective written, visual, and oral communication skills;
8. possess an educational background to understand the global context in which engineering is practiced, including:
   a. knowledge of contemporary issues related to science and engineering;
   b. the impact of engineering on society;
   c. the role of ethics in the practice of engineering;
9. have the ability to contribute effectively as members of multi-disciplinary engineering teams;
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers.

*Numbers in brackets refer to course objective(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

<table>
<thead>
<tr>
<th>Mathematics and Basic Sciences:</th>
<th>hours</th>
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</thead>
<tbody>
<tr>
<td>Engineering Sciences and Design:</td>
<td>3 hours</td>
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<tr>
<td>General Education Component:</td>
<td>hours</td>
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Prepared By: Mukul V. Shirvaikar
Modified By: Mukul V. Shirvaikar
Date: August 8, 2003
August 25, 2004
August 20, 2005
January 11, 2010