ENTC 3418.001/3418.201
MWF 10:00 - 10:50 (lec), MW 11:00-12:15 (lab)
Location: EN 220
Spring 2013
Office Telephone: 361-825-3378

Dr. Ruby Mehrubeoglu
Office: EN 222B
Office Hours:
MW 13:00-15:00, R 11:30-12:00
E-Mail: Ruby.Mehrubeoglu@tamucc.edu

ENTC 3418 Microprocessors and Microcontrollers

Prerequisite: COSC 1434
Meeting Time: MWF 10:00 – 10:50 p.m. (lecture) and MW 11:00 – 12:15 p.m. (lab)
Meeting Place: EN 220 (lecture and lab)

PROFESSOR INFORMATION
Dr. Ruby Mehrubeoglu (Dr. M.)
E-mail Address: ruby.mehrubeoglu@tamucc.edu
Office Phone: (361) 825-3378
Office Hours: MW 13:00-15:00 p.m., R 11:30 a.m.-12:00 p.m., and by appointment

COURSE DESCRIPTION
Introduction to microprocessor architecture, assembly language programming, and interfacing. Topics include computer organization, addressing modes, instruction set, interrupts, timing, memory, and interfacing.

LEARNING OBJECTIVES (STUDENT LEARNING OUTCOMES)
At successful completion of this course, students will have demonstrated their ability to:

- Compare the characteristics of microcontrollers and microprocessors
- Convert between decimal, binary, octal and hexadecimal numbers
- Perform addition and subtraction in different bases (10, 2, 8, and 16)
- Understand binary codes, ex. ASCII, gray code, BCD, etc.
- Contrast machine, assembly, and high level programming languages
- Use software development tools (Keil software) to program microcontrollers
- Write assembly language programs that use the microcontroller addressing modes and instruction set
- Develop assembly language programs for I/O applications using the microcontroller ports, including building a circuit, downloading program, and testing operation
- Write and test assembly language programs (using a hardware circuit) that use the 8051 timers
- Write and test assembly language programs that use the external 8051 interrupts.
- Design, develop and analyze microcontroller interface circuits
- Demonstrate effective communication skills

REQUIRED TEXT
LAB MANUALS
None to buy. Handouts will be used. Also, the following user manuals are available in the lab for students’ use:

1. Getting Started with the Microcontroller Student Learning Kit (PBMCUSLK) Prototyping Board and the MC9S12C32 MCU Application Module.

INSTRUCTIONAL METHODS AND ACTIVITIES
Methods and activities for instruction include the following: lectures, homework assignments, lab experiments/exercises, exams, quizzes, a lab notebook, and a team project with a proposal and final report.

MAJOR COURSE REQUIREMENTS AND ASSESSMENT
Evaluation of student performance is based on homework assignments, quizzes, a midterm, lab experiments/exercises, a team project, and a final exam. No makeup exams will be given in this course unless previously arranged with the instructor. The students are expected to attend class, and turn in assignments on or before the due date. A real-time lab notebook must be kept for the team project. Bonus points will be given to those projects that have the quality of a student paper, and is submitted to a local student research conference. The instructor will provide details for the conference.

You may examine the final exam within four weeks after the final grades are mailed to you. The final grade is assigned as follows.

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<thead>
<tr>
<th></th>
<th>Points</th>
<th>If</th>
<th>Grade</th>
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<tr>
<td>Homework/Quizzes</td>
<td>15</td>
<td>90 \leq \text{total}</td>
<td>A</td>
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<tr>
<td>Prelabs/Lab exercises/reports</td>
<td>20</td>
<td>80 \leq \text{total} &lt; 90</td>
<td>B</td>
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<td>Midterm Examination</td>
<td>20</td>
<td>70 \leq \text{total} &lt; 80</td>
<td>C</td>
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<tr>
<td>Final Project Proposal</td>
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<td>60 \leq \text{total} &lt; 70</td>
<td>D</td>
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<tr>
<td>Final Project Presentation/Report</td>
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<td>Project Notebook + Project Demo</td>
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<td>Final Examination</td>
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<td><strong>Total</strong></td>
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EMAIL ADDRESS
You must supply the instructor with a current email address and check your email account often. You supply your email address by sending an email message by the end of the first week to ruby.mehrubeoglu@tamucc.edu. In the subject area, type ENTC 3418 and write your full name.
ATTENDANCE POLICY
You are expected to attend all lectures and laboratories. If you miss a class period, you are responsible for whatever is covered or announced during your absence. There will be absolutely no make ups for missed oral presentations or quizzes.

CLASSROOM/PROFESSIONAL BEHAVIOR
Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

CELL PHONE/ELECTRONIC DEVICE USAGE
The use of cell phones, electronic devices, or computers for purposes other than those of the course objectives of the day is not permitted. Restricted activities include but are not limited to text messaging, twittering, talking on the phone, browsing on the internet, or disrupting the classroom activities. Anyone displaying unprofessional classroom behavior will be asked to leave the classroom or the laboratory.

LATE ASSIGNMENTS
Late assignments will only be accepted with penalty. There will be a 20 point deduction per late day from the total score of maximum 100 up to 5 days, after which a late assignment will not be accepted.

ACADEMIC INTEGRITY
Plagiarism and other academic dishonesty are not tolerated. Your attention is called to the University policy in the Student Handbook.

FOOD AND DRINK
Eating or drinking is NOT permitted in the labs. Students with food or drink will be asked to discard such items, or leave the room.

SAFETY
The safety of students, faculty, staff and visitors to the ET laboratories is of paramount importance to the Mechanical Engineering and Engineering Technology Program. You must follow all safety procedures and use personal protective equipment as required in each laboratory. Any student who attempts to use equipment without authorization or violates any safety policy or regulation will be removed from the laboratory immediately.

GRADE APPEALS
As stated in University Rule 13.02.99.C2, Student Grade Appeals, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days...
allowed for completing the steps in the process, see University Rule 13.02.99.C2, Student Grade
Appeals, and University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These
documents are accessible through the University Rules Web site at
http://www.tamucc.edu/provost/university_rules/index.html. For assistance and/or guidance in the
grade appeal process, students may contact the Office of Student Affairs.

DISABILITIES ACCOMODATIONS
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides
comprehensive civil rights protection for persons with disabilities. Among other things, this
legislation requires that all students with disabilities be guaranteed a learning environment that
provides for reasonable accommodation of their disabilities. If you believe you have a disability
requiring an accommodation, please call or visit Disability Services at (361) 825-5816 in Driftwood
101.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the
classroom or on campus, please contact the Disability Services office for assistance at
(361) 825-5816.

SUPPLEMENTARY READING LIST
4. Mazidi and Mazidi, *The 80x86 IBM PC and Compatible Computers (Volumes I and II),
5. Muhammad Mazidi and Janice Mazidi, *The 8051 Microcontroller and Embedded Systems*,
6. Walter Triebel and Avtar Singh, *The 8088 and 8086 Microprocessors: Programming,
10. James Stewart and Kai Miao, *The 8051 Microcontroller: Hardware, Software, and
12. Ramesh Gaonkar, *Fundamentals of Microcontrollers and Applications in Embedded
    Systems (with the PIC18 Microcontroller Family)*, Clifton Park: THOMSON Delmar
    Learning, 2007.
    Learning, 2005.
<table>
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<tr>
<th>WK</th>
<th>DATES</th>
<th>Readings</th>
<th>Topics</th>
<th>Labs/Exams</th>
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<tr>
<td>1</td>
<td>01/23, 01/25</td>
<td>Ch. 0</td>
<td>Course requirements, Introduction to Computing</td>
<td>Lab Safety</td>
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<td>Ch. 1</td>
<td>Microcontroller and Microprocessor features</td>
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<td>3</td>
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<td>Ch. 2 App. A, B</td>
<td>Microcontroller Architecture and Assembly Language</td>
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<td>Ch. 3 App. C, D</td>
<td>Branch, Call and Time Delay Loop</td>
<td>Lab 3 (Prelab 3 &amp; Lab 2 reports due)</td>
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<td>Ch. 4 App. E, F</td>
<td>I/O Programming</td>
<td>Lab 4, (Lab 3 Report Due)</td>
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<td>Ch. 5 App. G, H</td>
<td>Arithmetic, Logic Instructions, and Programs</td>
<td>Lab 5 (Prelab 5 &amp; Lab 4 reports due)</td>
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<td>Addressing Modes, LUT, Macros and Modules</td>
<td>Lab 6 (Prelab 6 &amp; Lab 5 report due)</td>
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<td>9</td>
<td>03/18, 03/20, 03/22</td>
<td>Ch. 7</td>
<td>Programming HCS12 in C Handout project guidelines</td>
<td>Lab 7 (Prelab 7 &amp; Lab 6 report due) Midterm</td>
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<td>Timer Programming</td>
<td>Lab 8, (Prelab 8, and Lab 7 Report Due) (Lab 8 report due) Project proposal Reports/ Presentations</td>
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<td>Interrupt Programming Project (conference paper due (optional))</td>
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<td>Ch. 12, 13</td>
<td>Interfacing: LCD, Keyboard, ADC, DAC and Sensors</td>
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<td>Ch. 13, 14</td>
<td>Accessing Flash and EEPROM Project + BONUS paper</td>
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<td>05/06</td>
<td>Exam Review</td>
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<td>Project Reports</td>
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**Final examination: Friday, 10 May 2013, 11:00 a.m. – 1:30 p.m.**

* Changes, if any, will be announced in class