CPE/EE 421/521: Microcomputers

Course Home Page: [http://www.ece.uah.edu/~milenka/cpe421-06F/](http://www.ece.uah.edu/~milenka/cpe421-06F/)

**Lectures**  
Monday/Wednesday 2:20 - 3:40 PM, EB239.

**Instructor**  
Dr. Aleksandar Milenkovic  
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**Office hours**  
Monday 5:30 – 6:30 PM; Wednesday 1:00 – 2:00 PM; or by appointment.

**Description**  
The goal of this course is to teach students how to design microcomputer systems and how to utilize a microprocessor or a single chip microcomputer as a basic system component. The course begins with an overview of typical microcomputer architecture and examines the hardware features of the microprocessor system. Basic microcomputer design and the interface between the microprocessor and external devices are explored. This course examines the software aspects of microcomputers using assembly language and C programming. The course also introduces single chip microcomputers for embedded and power efficient applications. By the end of the course the students have studied all the computer components necessary to be able to design and implement a basic computer system and interface it to the outside world. Experiments performed in the Microcomputer Laboratory provide considerable experience, allowing students to develop programs in assembly and C and download them into a target microcomputer.

**Prerequisites**  
CPE/EE 321 (Computer Organization).

**Text**  

**References**
### Grading

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>Graduate</th>
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<tbody>
<tr>
<td>Laboratory assignments/exams</td>
<td>Laboratory assignments/exams 15%</td>
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<tr>
<td>Homeworks</td>
<td>Homeworks 10%</td>
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<td>Test I</td>
<td>Test I 10%</td>
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<td>Test II</td>
<td>Test II 10%</td>
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<tr>
<td>Final Exam (Comprehensive)</td>
<td>Final Exam (Comprehensive) 25%</td>
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<td>Discretion</td>
<td>Project 25%</td>
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<td>Discretion 5%</td>
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- **Late Submission**: Homeworks and Lab reports – 10% off per day
- **Homeworks/Laboratories** will not be accepted after 5 days past the due date

### Important Dates
- Test I & Test II: 10/04/06, 11/01/06 (tentatively)
- Last day of Class: December 5, 2006.
- Final exam: December 13, 2006 (3:00 – 5:30 PM).

### Course Outline
- **Introduction to Microprocessor-Based System Design**
- **Motorola 68000 processor Architecture**
- **Microcomputer Architecture -- Programmer's View** (overview of MC68000 family of microprocessors basic assembly language programming of the MC68000)
- **MC68000 Software development** (*Lab Sessions*)
- **Software Development for the MC68000** (High-Level Language Considerations – C programming)
- **Single chip microcomputers - Hardware and System Issues** (Texas Instruments MSP430 microcontroller family)
- **TI MSP430 Software development** (*Lab Sessions*)
- **Single chip microcomputers – Low Power Issues**
- **Single chip microcomputers – Software Issues, Exceptions, Interrupts, Real time operation, Real time kernels**
- **Microprocessor Architecture – Hardware Details** (MC68000 CPU specifications, pin descriptions and timing analysis, I/O interfacing, Parallel and serial data transfer using custom hardware and MC6800/MC68000 type peripheral IC's)
- **Microcomputer System Design** (ROM, EPROM, EEPROM, Static and Dynamic RAM, connections, signals and timing)

### Laboratory

The Microcomputer Laboratory is located in the room 106 of the Engineering Building. Students will be required to work individually on a set of laboratory experiments that are designed to reinforce the material being covered in the class.

Lab policies: 1. You must demonstrate all labs to the lab instructor during your assigned lab session. 2. You must hand in a printout of your code to the lab instructor.

### Academic Policy
See [http://www.ece.uah.edu/~milenka/cpe421-06F/#Info](http://www.ece.uah.edu/~milenka/cpe421-06F/#Info)