



*Department of Electrical and Computer Engineering*

**Spring 2010**

## **CPE 323: Introduction to Embedded Computer Systems**

Course Home Page: <http://www.ece.uah.edu/~milenka/cpe323-10S/>

- Lectures** Monday, Wednesday 3:55 - 5:15 PM, EB-207.
- Instructor** Dr. Aleksandar Milenkovic, Office: 217-L, Engineering Building  
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Web: <http://www.ece.uah.edu/~milenka>
- Office hours** Monday/Wednesday 1:00 - 2:00 PM or by appointment.
- Lab Instructors** Ms. Zahra Atashi, EB 242-A, Tel: 824 6304, Email: [atashiz@ece.uah.edu](mailto:atashiz@ece.uah.edu)  
Mr. Avula Mallikarjun (Max), EB 246-E, Tel: 824 3485, Email: [ma0004@uah.edu](mailto:ma0004@uah.edu)  
Mr. Kalaimannan Ezhil, EB 242-F, Tel: 824 3486, Email: [ek0001@uah.edu](mailto:ek0001@uah.edu)
- Description** The course examines both hardware and software aspects in building embedded computer systems, as well as methods to evaluate design tradeoffs between different technology choices. The students develop an appreciation of technology capabilities and limitations and appreciation of all system components necessary to design and implement a basic embedded 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 language and C and program embedded systems to perform required functions.
- Prerequisites** EE 202, CPE 212. Corequisite: CPE 323L
- Text** John H. Davies, *MSP430 Microcontroller Basics*, Newnes/Elsevier, 2008, ISBN: 978-0-7506-8276-3
- References**
- Class handouts (lecture notes and tutorials)
  - MSP430 Family, User's Guide, Texas Instruments.
  - MSP430 Family, Software User's Guide, Texas Instruments.

## Grading

Laboratory assignments	30%
Homeworks	15%
Test I	15%
Test II	15%
Final Exam (comprehensive)	25%

**Late Submission** Homeworks and Lab reports – 10% off per day  
Homeworks and Lab reports will not be accepted after 5 days past the due date

**Important Dates** Test I & Test II: February 24, 2010 & April 07, 2010 (tentatively).  
Last day of Class: April 26, 2010.  
Final exam: May 3, 2010 (3:00 – 5:30 PM).

## Course Outline

- Introduction to Microprocessor-Based System Design
- TI MSP430 Microcontroller: An Introduction
- Programmer's View (TI MSP430):  
Registers, Data types, Memory, Addressing Modes, Instruction Sets, Instruction Encoding
- Software development: Assembly Programming and Debugging (TI MSP430)
- Software Development: C/C++ (TI MSP430)
- TI MSP430 System Architecture
- Exception Handling, Basic clock module
- I/O Interfacing: Parallel Ports, Timers (Watchdog Timer, Timer A, Timer B) (TI MSP430)
- I/O Interfacing: Serial Communication (TI MSP430)
- I/O Interfacing: ADC (TI MSP430); DAC (TI MSP430); DMA (TI MSP430)
- Advanced Topics: Building An Embedded Computer Systems

**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 your solution for each laboratory assignment to the lab instructor during your assigned lab session.
2. You must hand in a printout of your code and test vectors to the lab instructor.
3. Although highly discouraged, lab assignments may be turned in after the due date with a penalty of 10% off per day late (including weekend days). Lab assignments will not be accepted more than 5 days late.

**Academic Policy** See <http://www.ece.uah.edu/~milenska/cpe323-10S/#Info>