

# Course Syllabus

Welcome to Single-Chip Microcomputers. This course expands your knowledge of microprocessors from ECE 445 and puts them into a system context. You will be introduced to the principle of a microcontroller, which comprises all elements of a basic computer system on a single chip, i.e. microprocessor, memory and I/O devices. Based upon this single-chip microcomputer, you will learn how to interface it with other devices, such as sensors, keypads, and displays. This course also covers real-time control issues, assembly language programming for control, design of control software, input/output methods, design tools, and available single-chip microcomputers. In the associated lab you will be designing and constructing systems including a single-chip microcomputer and ancillary hardware to implement a complete control system.

**Topics:** Include introduction to the MSP 430, software development using C and assembly, polling, interrupts, timers, real time clock (RTC), ADC, DCA, serial peripheral interface (SPI), I2C, RS232.

<b>Faculty:</b>	Classes and Coordination	Jens-Peter Kaps	jkaps@gmu.edu
<b>Lab Instructors:</b>	Monday Labs	Umar Sharif	msharif2@gmu.edu
	Tuesday Labs	Bilal Habib	bhabib@gmu.edu
	Wednesday Labs	Umar Sharif	msharif2@gmu.edu
	Thursday Labs	Bilal Habib	bhabib@gmu.edu
<b>Lectures:</b>	3:00 – 4:15 pm, Tuesday and Thursday		ENGR 1103
<b>Labs:</b>	7:20 – 10:00 pm, Monday, Tuesday, Wednesday, Thursday		ENGR 3208
<b>Class Web Page:</b>	<a href="http://ece.gmu.edu/~jkaps/courses/ece447">http://ece.gmu.edu/~jkaps/courses/ece447</a> and on Blackboard		
<b>Textbooks:</b>	J. H. Davies, MSP430 Microcontroller Basics, Burlington, MA: Newnes, 2008, ISBN 978-0-7506-8276-3.		
	B. W. Kernighan, and D. M. Ritchie, The C Programming Language, 2nd Ed., Englewood Cliffs, NJ:Prentice-Hall, 1998, ISBN 0-13-110362-8 (paperback).		
<b>Hardware:</b>	Each student is expected to purchase a lab kit		
<b>Software:</b>	IAR Kickstart Environment	<a href="http://www.ti.com/tool/iar-kickstart">http://www.ti.com/tool/iar-kickstart</a>	
	Code Composer Studio v4	<a href="http://www.ti.com/tool/ccstudio">http://www.ti.com/tool/ccstudio</a>	
<b>Office Hours:</b>			
Jens-Peter Kaps	Monday 3:00 – 4:00 pm	ENGR 3222	
	Wednesday 3:00 – 4:00 pm		
Bilal Habib / Umar Sharif	Monday 1:00 – 2:00 pm	ENGR 3204	
	Bilal Habib Tuesday 1:00 – 3:00 pm	ENGR 3208	
Umar Sharif	Wednesday 1:00 – 2:00 pm,	ENGR 3208	
Umar Sharif / Bilal Habib	Saturday 11:00 – 1:00 pm	ENGR 3208	

Please check the class web page for updates to this office hour schedule. The best way to contact us outside class and office hours is via e-mail or **for questions that might interest several students via the discussion group on Blackboard.**

**Required Background:**

- ECE 445 Computer Organization (grade C or better)
- ECE 332 Digital Electronics and Logic Design Lab (grade C or better)  
and either
- CS 367 Computer Systems and Programming (grade C or better)  
or
- CS 222 Computer Programming for Engineers (grade C or better)

**Reading Assignments**

The reading assignments are shown in the class calendar in the rightmost column, first row in a week. They refer to sections in the Davies text that need to be read by the beginning of the week. Reading assignments for the weeks of November 21<sup>st</sup> and November 28<sup>th</sup> refer to documents that can be retrieved from the TI website or Blackboard. These documents should be printed and reviewed.

**Quizzes:**

There will be up to 12 quizzes during the course of this class. These quizzes will be based on reading assignments and material covered in class. They will be not be announced in advance. Each quiz will be up to 20 minutes long and start at the beginning of class. The time of a quiz will not be extended for students arriving late.

**Labs:**

This course features a senior lab component. Students in ECE 447 will be granted access to the ENGR Room 3208 computer lab to complete their projects More information about the labs can be found in a separate lab syllabus.

**Exams:**

There will be two exams during the course. There will be NO make-up exams. (See Dr. Kaps for an exception at least 4 weeks before the exam.) Students who are more than 15 minutes late for an exam may not be admitted and will be assigned a grade of zero for the exam.

- **Midterm Exam:** Wednesday October 25<sup>th</sup>.
- **Final Exam:** Monday December 13<sup>th</sup>, **1:30pm** – 4:15pm.

**Grading:**

The final grade is based on a weighted sum of your performance in exams, homeworks, recitations and class participation:

	Total
Lab Assignments	40%
Midterm Lab Exam	10%
Midterm Exam	15%
Final Exam	25%
Quizzes	10%
	100%

**Credits:**

This course has 3 lecture hours and 3 lab hours per week and a total of 4 credits. For EE students, this course counts as 1 technical elective and 1 advanced laboratory course.

**Honor Code:**

All rules of the GMU Honor Code system will be in effect. You must review the rules and be familiar with them.

You are encouraged to discuss your projects with other students and/or obtain the assistance of the TA. Nevertheless, you must write down your own solutions which represent your understanding of the material. Projects must be completed individually. No part of a project submission can be copied from another student of the class from this or previous years or any other source.

Duplicating someone else's work such as but not limited to, hard-ware/software designs, diagrams, source code, project reports, and exam notes, is considered cheating. If you use material from other sources such as but not limited to the web, books, journals, data sheets, etc. you must reference the source. Honor code violations will be followed up with full force.

**Classroom Etiquette:**

Cellphones have to be put into silent mode. If you have an emergency need to answer a call please quietly leave the room BEFORE answering the call. Lectures may not be recorded without express written permission from the instructor.

**Students with Disabilities**

If you need special assistance, please inform the instructor within the first 3 weeks of classes so that we can work something out.

The Course Syllabus is Subject to Change