


CENG 5434 MICROCOMPUTER SYSTEMS DESIGN  
Syllabus, Learning Outcomes

COURSE: CENG 5434-01 Fall 2022 Wednesday 4:00-6:50 PM 24200  
INSTRUCTOR: Dr. Thomas L. Harman

MODE: Face to Face in  D 241

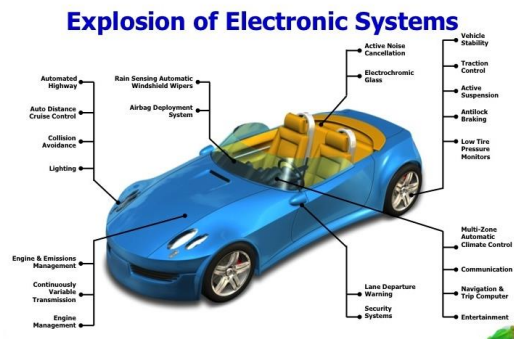
OFFICE HOURS: Email for Appointment: [harman@uhcl.edu](mailto:harman@uhcl.edu)

PREREQUISITES: Assembly Language and basic microcomputer knowledge

DESCRIPTION: The course presents a thorough study of microprocessors and microcomputers. The purpose is to introduce the students to the procedures necessary to design and develop hardware and software for applications. **A particular emphasis is the use of microchips in product design.**

COURSE FORMAT: The course presentations will be mainly lectures conducted via Blackboard and recorded so you can access them anytime. You can expect regular homework and several examinations. A final project is also required.

TEXT: *Handouts in Class and on Harman website*



**PROJECT:**

This semester the projects can consist of a written and oral report concerning some embedded system. Examples might be a network or communications application of a modern microprocessor. The report might involve the study of a particular chip, an I/O board, or a specific application or Product. The emphasis should be on the **modern microcomputer** and its use in the system or product.

A project could consist of a design with documentation and software for a complete module serving some useful purpose. For example, an I/O conversion and mathematical module could be designed. You could have a start for the capstone project or the Thesis.

## MICROCOMPUTER SYSTEMS DESIGN

### CENG 5434 Course Outline

<u>Duration</u>	<u>Material to be covered</u>	<u>Assignments</u>
1 week	Class Introduction, Website and Harman CV, Syllabus, Blackboard The Big Picture – Embedded Systems Examples System and Product Design Microprocessor History	
1-2 weeks	Development Tools, Languages Harman Applications and Optical Nose, Patents  Views of the Processors – System, Software, Interfaces Various Processors - Architecture, data, math	
1-2 weeks	Specific Processors ARM, PIC, TI	
2 weeks	Sensors and Analog Modules Programming Techniques	
2 weeks	System operation, traps and Interrupts, real-time considerations, RTOS	

### **MIDTERM EXAMINATION**

2 weeks	Serial Communication and I/O chips for communications  System Design and Project Handout – Project Examples	
2 weeks	Choosing a Microcomputer or Single-board computer	

**DUE: BRIEF ORAL AND WRITTEN SUMMARY OF YOUR PROJECT.**

2-3 weeks	Special Topics/ Design Examples/SoC/Wireless/Certifications/Patents	
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### **WEEK FINAL**

**DUE: FORMAL PRESENTATION ABOUT PROJECT AND DEMONSTRATIONS**

**\*Due Dates will be given with the assignment handout.**

**FINAL REPORTS – TYPED DUE THE NIGHT OF THE FINAL.**

## **Learning Outcomes CENG 5434**

**Define the process steps in Embedded System Design**

**Understand the errors in design caused by timing or math mistakes**

**Describe various microprocessors and microcontrollers**

**Understand the view of microcontrollers from the point of view of the system designer, programmer, and interface designer**

**Define the differences between various devices in terms of architecture and the modules available**

**Define the differences between various devices in terms of programming**

**Define the differences between various devices in terms of interfacing**

**Write a project report according to the directions and give presentations in class.**