

# ECE 3567: Microcontroller Lab

## Course Description

Laboratory in which a microcontroller is used to interface real-world hardware to make a functioning system.

**Prior Course Number:** 567

**Transcript Abbreviation:** Microcontrol Lab

**Grading Plan:** Letter Grade

**Course Deliveries:** Classroom

**Course Levels:** Undergrad

**Student Ranks:** Junior, Senior

**Course Offerings:** Autumn, Spring, Summer

**Flex Scheduled Course:** Never

**Course Frequency:** Every Year

**Course Length:** 14 Week

**Credits:** 1.0

**Repeatable:** No

**Time Distribution:** 3.0 hr Lab

**Expected out-of-class hours per week:** 0.0

**Graded Component:** Laboratory

**Credit by Examination:** No

**Admission Condition:** No

**Off Campus:** Never

**Campus Locations:** Columbus

**Prerequisites and Co-requisites:** Prereq: 2560 or CSE 2421, and enrollment in ECE, CSE, or EngPhysics major.

**Exclusions:** Not open to students with credit for 3567.01.

**Cross-Listings:**

**Course Rationale:** Existing course.

**The course is required for this unit's degrees, majors, and/or minors:** Yes

**The course is a GEC:** No

**The course is an elective (for this or other units) or is a service course for other units:** Yes

**Subject/CIP Code:** 14.0902

**Subsidy Level:** Baccalaureate Course

## Programs

Abbreviation	Description
CpE	Computer Engineering
EE	Electrical Engineering

## Course Goals

Mastery of software development platforms such as Code Composer Studio
Competency with microcontroller architecture configuration with emphasis on the users manual.
Mastery writing C Programming Language using the embedded code style. Familiarity with the unique features of embedded code and understanding how this is a departure from higher level applications
Be competent in using the microcontroller peripherals for applications such as Pulse Wave Modulated wave Generation, Arbitrary Wave Generation, Frequency Measurement, Analog to Digital Conversion and RC measurements.

## Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Software tools for programming in C Language such as editors, compilers and debuggers			5.0					
Clock Module of a microcontroller			5.0					
Timing Module of a microcontroller			5.0					
PWM generation using the peripherals of a microcontroller			5.0					
Arbitrary Signal generation using the peripherals of a microcontroller			5.0					
Frequency measurements using the peripherals of a microcontroller			5.0					
Handling Interrupts			4.0					
Analog to Digital Conversion			4.0					
Resistance and capacitance measurement using the peripherals of a microcontroller			4.0					

## Representative Assignments

Bi-weekly quizzes and a lab report per lab.
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## Grades

Aspect	Percent
Quizzes	30%
Lab notebooks, reports and demonstrations of project working at appropriate stage of development.	70%

## Representative Textbooks and Other Course Materials

Title	Author
<i>Lab Notes (Readme files, supporting documents), Microcontroller Data Sheets, Instructional Screencast videos</i>	

## ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
***	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
**	c	An ability to design a system, component, or process to meet desired needs.
	d	An ability to function on multi-disciplinary teams.
**	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
**	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.

Course Contribution		College Outcome
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### CpE ABET-EAC Criterion 9 Program Criteria Outcomes

Course Contribution		Program Outcome
***	1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
	2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
**	3	an ability to communicate effectively with a range of audiences
*	4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
**	5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
***	6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
***	7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

### EE ABET-EAC Criterion 9 Program Criteria Outcomes

Course Contribution		Program Outcome
***	1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
	2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
	3	an ability to communicate effectively with a range of audiences
*	4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
*	5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
***	6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
***	7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

### Additional Notes or Comments

Change prereqs to delete 265, added 3567.01 to exclusion.

removed comma in prereqs to clarify it's CSE 360

changed "and CSE 2421" "or CSE 2421" Oct 10, 2013

Reword course goals, expand course topics, adjust ABET Criteria weights, add detail on course text 5/25/14 BLA

update goals and topics 6/17/16 BLA

Updated text info, 5/10/17, CED

Correct typo in course topic 2 6/2/2017

Updated text info, 3/5/20, CED

**Prepared by:** Carol Duhigg