



**Course Syllabus
SEMESTER
School of STEM**

Course Name:	Advanced Digital Circuits
Course & Section Number:	EET205-XXX
Meeting Day(s) & Time(s):	Lecture: Lab:
Credits:	4
Contact Hours:	6
Text:	None
Instructor's Name:	
Office Hours & Location:	
OCC Phone:	
OCC Email:	

Disclaimer: The instructor reserves the right to amend this syllabus as deemed necessary and will communicate such amendment to the students in the course. Please note that while unlikely, there is a possibility courses might need to change the delivery method due to external issues like public health concerns, weather issues, etc. If this happens, the college will communicate any changes via email and/or other communication methods.

Catalog description:

This capstone course covers microcontroller architecture and microcontroller usage in a variety of applications. Topics include: programming instruction sets, port I/O, hardware interfacing techniques, hardware interrupts, timer interrupts, volatile and non-volatile memory, analog to digital conversion, busses, and serial communications. The microcontroller will be connected to a computer and controlled with a GUI written by the student. This course includes a weekly hands-on lab and a capstone project. The lab experiments are designed to verify and reinforce the concepts presented in the lecture.

Prerequisite/Corequisites:
EET201

Course Materials:

No textbook is required.

A windows computer or laptop is needed to program the GUI and microcontroller.

All lecture and lab materials can be found at: [https:// DrWedding.com](https://DrWedding.com)

What You Will Learn in the Course

Course Objectives:

This capstone course covers microcontroller architecture and microcontroller usage in a variety of applications. Topics include: programming instruction sets, port I/O, hardware interfacing techniques, hardware interrupts, timer interrupts, volatile and non-volatile memory, analog to digital conversion, busses, and serial communications. The microcontroller will be connected to a computer and controlled with a GUI written by the student. This course includes a weekly hands-on lab and a capstone project. The lab experiments are designed to verify and reinforce the concepts presented in the lecture.

Student Learning Outcomes:

Students will:

Outcome	Where Assessed
1) The student will isolate the controller from the circuit using transistors, relays, voltage dividers, etc.	Lab 1
2) Use the native development platform to write and debug micro controller code.	Final Project
3) Generate a working hardware and/or timer-based interrupt(s).	Lab 4
4) Interface an analog signal to an A to D port on a uController and use this information to control external hardware.	Lab 5
5) Set up communications between a uController's scratchpad (DMA) and a com/USB port on a computer.	Lab 8

Program Outcomes:

The following program outcomes are assessed in this course

Outcome	Where Assessed
Construct DC and AC Electronic circuits.	Labs 1-10, quizzes 1-3, and the final project
Produce professional project documentation.	Project presentation.

Institutional General Education Competencies:

As a student at Owens Community College, you will take General Education courses as part of your degree program. While specific to the General Education courses, will be reinforced in many of your degree program major courses and may be measured in your capstone course(s) and others as identified.

Competency	Where Assessed
Demonstrate quantitative and scientific reasoning.	Quizzes 1-3 and the final project.
Communicate effectively.	Lab 1-10 summaries and the final project presentation.

Technology, Lab, and File Requirements:

- You will be issued a lab kit that MUST be returned at the end of the semester. Failure to do will result in an F for the class.
- You will need a Window's based computer to run the software.
- Download and install the Picaxe IDE from the link below.
<https://picaxe.com/software/picaxe/picaxe-editor-6/>
- Download and install the Picaxe 027 cable driver from the link below.
<https://picaxe.com/software/drivers/axe027-usb-cable-driver/>
- Download and install Visual Studio Community from the link below.
<https://visualstudio.microsoft.com/free-developer-offers/>

Academic Support

Disability Services Resource Center: If you have a disability or acquire one, you may be entitled to receive reasonable accommodations intended to assure you an equal opportunity to participate in and benefit from the program. To receive more information or to register for accommodations, please contact the Disability Resource Center at 567-661-7007, email disability@owens.edu, visit <https://www.owens.edu/disability/>, or stop by College Hall 124.

Tutoring Services: Owens Community College offers academic tutoring and assistance in a variety of subjects including: accounting, computing, economics, mathematics, science, and writing. For more information go to: <https://www.owens.edu/successcenters/>.

Counseling Services: Counseling Services provides assistance to students experiencing personal, educational, interpersonal/relationship, family, social, or psychological difficulties. If you feel you may benefit from this service, please contact them at counselingservices@owens.edu. More information is at <https://www.owens.edu/counseling/>.

Campus and Community Connections: The Center for Campus and Community Connections (College Hall 151) is a walk-in office created to provide retention support through resource stability initiatives and community connections. Go here for more information: <https://www.owens.edu/connection/> or contact connections@owens.edu

Owens Library: The Owens Library offers two locations (Toledo and Findlay) as well as online

resources. For more information visit <https://www.owens.edu/library/>.

Students can find more information on campus resources, student support, student life, and security at this [link](#).

General Information

Student Code of Conduct: All students are expected to follow Owens Community College's Student Code of Conduct, which includes academic honesty, encompassing plagiarism. See the Board Policy for more information.

Anti-Discrimination and Harassment & Title IX/Sexual Misconduct: All students, faculty, and staff are expected to follow Owens Community College's Anti-Discrimination and Harassment Policy and the College's Title IX Policy/Sexual Misconduct Procedures and Guidelines. The College strictly prohibits and will not tolerate harassment, discrimination, intimidation, or hostile/offensive working or learning environments.

Religious Accommodations: A student seeking an accommodation for an absence permitted under Ohio's Testing Your Faith Act must provide the instructor with a written email notice with the specific dates for an absence, and must do so not later than fourteen (14) days after the first day of instruction. Alternative accommodations are not retroactive, and no academic penalty will be imposed for an absence under the policy*. The request for an alternative accommodation will be kept confidential. Students with questions about a religious accommodation under Ohio's Testing your Faith Act may contact the College's Office of Academic Affairs: provost@owens.edu. The policy may be found on the Owens website: [3358:11-2-63 Accommodation for a Student Absence for the Observance of Religious Beliefs and Practices Policy](#)

Document Collection: Throughout the semester, your instructors may ask for a variety of assignments including tests and/or quizzes for student learning of institutional general education competencies or program assessment. Please save all your class materials until the end of the semester.

Classroom Admittance: OCC classes shall only be attended by the officially registered OCC students or perspective students, instructor of record, guest lecturer, or substitute. Visitors are not permitted to be in the classroom and should not be invited to attend or participate in the class. See [FERPA](#) regulations for more information.

Use of AI Tools: This course permits you to use artificial intelligence (AI) tools, such as chatbots, text generators, paraphrasers, summarizers, or solvers, to get guidance on assignments, as long as you do so in an ethical and responsible manner. Essentially, you can think of these tools as ways to help you learn but not to entirely create work for assignments like discussion board posts, essays, presentation slides, and so on. AI is more like your tutor or TA, not a replacement for your independent thinking. This means that you must:

- Not use AI tools to replace your own thinking or analysis or to avoid engaging with the

course content.

- Cite or explain any AI tools you use. Provide the name of the AI tool, the date of access, the URL of the interface, and the specific prompt or query you used to generate the output.
- Be transparent and honest about how you used the AI tool and how it contributed to your assignment. Explain what you learned from the AI tool, how you verified its accuracy and reliability, how you integrated its output with your own work, and how you acknowledged its limitations and biases.

You are accountable for any mistakes or errors made by the AI tool. Always check and edit the output before submitting your work. If you discover any inaccuracies or inconsistencies in the output after submission, notify the instructor immediately and correct them as soon as possible. Using AI tools in an unethical or irresponsible manner, such as copying or paraphrasing the output without citation or transparency, using the output as your own work without verification or integration, or using the output to misrepresent your knowledge or skills, is considered a form of academic dishonesty and will result in a zero grade for the assignment and possible disciplinary action. If you have any questions about what constitutes ethical and responsible use of AI tools, please consult with the instructor **before** submitting your work.

NOTE: Some instructors will also list specific acceptable and unacceptable uses or include a statement like “All written assignments, projects, and exams must be completed independently.”

Student Responsibilities & Instructor Expectations

Instructor Expectations:

Attendance is not required – but highly suggested.

The bulk of your knowledge will come from the lectures and the hands-on labs. Attendance is not included in your final grade. However, missing class may reduce your knowledge and cause your lab and quiz grades to drop.

Classroom Environment:

- 1) No eating, drinking, vaping, chewing, or smoking in the lecture room or laboratory.
- 2) It is the student's responsibility to obtain missed notes, handouts, and assignments.
- 3) All rules in the student handbook will be enforced.

How Grades are Determined and Major Assignments

Lecture: The lecture notes are just an outline of the topics being discussed. It is the student's responsibility to take notes from the lecture and copy examples from the board.

Labs: Labs should be turned in one week after the lab has been performed. Labs must be done neatly. Schematics must be done by a computer program of your choice. All questions and summaries must be typed and in complete sentences. Calculations do not need to be typed. The questions and summary will be stapled to the back of the lab. Handwritten questions and summaries will not be graded.

Tests: Take home quizzes/tests are open book and open notes. This does not mean you can turn in someone else's work. Turn in someone else's work is cheating and will result in disciplinary action.

Evaluation Measure	Student Learning Outcomes Assessed	Value
10 Labs @ 4% each	1-5	40% ¹
3 Quizzes at 10% each	1-5	30% ²
Final project	1-5	30% ²

Per the department rules:

1 Your lab grade average must be greater than 60 % to pass the class.

2 Your lecture grade average (the quizzes and the final) must be greater than 60 % to pass the class.

Grading Procedure:

Grades will be calculated on the following scale.

90% and Above	A
80% to Less than 90%	B
70% to Less than 80%	C
60% to Less than 70%	D
Less Than 60%	F

Tentative Class Assignments:

<u>WEEK</u>	<u>Date</u>	<u>Lecture Topics</u>	<u>Lab Topics</u>	<u>SLO</u>
1	DATE	Introduction, Review, and IO Interface requirements	Lab 1*	1
2	DATE	Microprocessor/microcontroller architecture and Assembly	Lab 2	1-2
3	DATE	Strobing, polling, and multiplexing; bus timing diagram; and debugging	Lab 3	1-2
4	DATE	Quiz #1 / Final Project Assigned	Quiz #1	1-2
5	DATE	Interrupts and State machines	Lab 4 *	1-3
6	DATE	ADC and Feedback	Lab 5 *	1-4
7	DATE	EASY EDA Schematics and Gerber files	Lab 6	1
8	DATE	Quiz #2	Quiz #2	1-3
9	DATE	VB as an HMI	Lab 7	1-5
10	DATE	Serial Communications, UART, Interrupt based IO, and DMA	Lab 8 *	1-5
11	DATE	VB controlling the PICAXE	Lab 9	1-5
12	DATE	Quiz #3	Quiz #3	1-5
13	DATE	Memory technologies interfacing, bus timing diagrams, and I2C	Lab 10	1-5
14	DATE	TBD	TBD	1-5
15	DATE	Presentation	Presentation*	1-5
16	DATE	Finals Week: Return kits (failure to return your kit is an automatic F)		