

# Sample Syllabus

## ME 348 CIRCUIT ANALYSIS, INSTRUMENTATION, AND STATISTICS (3 CREDITS)

### Instructor:

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TAs: See Canvas for a file with names and contact information for all teaching assistants.  
Office Hours: See Canvas for a file with office hours, times, and locations.

### 1. Course Prerequisites:

Prerequisites: MATH 251 and PHYS 212

### 2. Measurable Student Learning Outcomes:

By the end of this course, students will be able to:

1. Build and analyze basic electronic circuits on a breadboard.
2. Predict and mathematically analyze the performance and behavior of sensors and instruments.
3. Select appropriate sensors and instrumentation for measuring physical phenomena in mechanical engineering applications.
4. Predict, program, and evaluate the behavior of digital data acquisition systems and utilize FFTs for frequency analysis.
5. Collect and statistically analyze laboratory experimental data.
6. Design and carry out an experiment to test a hypothesis, making a statistically justifiable conclusion.
7. Collaborate and function effectively as a member of a multidisciplinary project team.
8. Demonstrate professionalism in oral and written communications with course instructors and fellow students.

### 3. Learning Resources:

**Required textbook:** No required textbook.

**Required course kit:** The "Entrance-to-Major (ETM) Arduino Student Kit" is required for this course and future ME courses including ME 454. To order the kit and receive a \$50 discount, please go to: <https://www.pitsco.com/Penn-State-Mechanical-Engineering-ETM-Kit> and enter promo code "PENNFL24" at checkout. The discount may only appear after you've entered shipping and billing addresses. The kit will be shipped to Reber regardless of what shipping address you use when checking out. Kits will be distributed from Reber 20 at scheduled times, as discussed in class.

**Required software:** We will be interfacing electrical hardware with the [Arduino IDE](#) and [MATLAB/Simulink](#) software for both labs and homework. All software used in the course is available to you for free, and instructions for downloading these will be included in the labs where necessary. The code we'll be running was written for **MATLAB version R2021a or R2022a**, but *should* also be compatible with more recent versions.

If you do not have a personal computer that meets MATLAB's minimum specification requirements, keep in mind that the computers in the Reber Knowledge Commons should have the necessary software and may also be used as an alternative.

#### **4. Canvas and Gradescope:**

All notes, assignments, laboratories, and other reference material will be posted on the course page on Canvas. Communication will also be conducted through Canvas, and students are required to check announcements frequently, or set up Canvas to deliver announcements via email, text message or whichever format you prefer. All graded work will be submitted through Gradescope, accessible through Canvas. Instructions will be provided in lecture and lab.

#### **5. Canvas Learning Modules and Lectures**

**Learning Modules:** No textbook is required for this course. However, every lecture will have one or more corresponding “learning module” documents, which may be accompanied by a short introductory video on Canvas. **Closely reading these learning modules and/or watching the videos in advance of the lectures each week will be critical to your success in the course.** The lectures will focus on supplementing the learning modules by highlighting key points and solving example problems. Reviewing the learning modules before class is NOT optional, and the lectures are NOT a replacement for the learning modules. The schedule is posted on Canvas.

**Lectures:** Lectures will be held **in person** at the time and address listed at the top of this document. Some equations and examples will be written into the slides during lectures. Due to faculty research related travel, some lectures will be delivered via asynchronous recordings. These lectures are indicated on the course schedule. Blank slides will be provided prior to class, and annotated slides posted following class.

#### **6. Evaluation of Student Performance:**

A final course grade will be determined using the following breakdown:

- 20% Individual Homework (lowest dropped)
- 45% Midterm and Final Exams 3 exams, equal weight)
- 35% Labs (Individual prelab, team lab report, peer review)

The final numerical score will be translated to a traditional A-F letter grade scale according to the following thresholds. **Final grades will be rounded to the nearest tenth.**

A	$\geq 93.0$
A-	$\geq 90.0$
B+	$\geq 87.0$
B	$\geq 84.0$
B-	$\geq 80.0$
C+	$\geq 77.0$
C	$\geq 70.0$
D+	$\geq 67.0$
D	$\geq 64.0$
D-	$\geq 60.0$
F	$< 60.0$

Late Drop:

- Late drops prior to first exam -WN
- Late drops after first exam:
  - With a score  $\geq 60\%$  -WP
  - With a score  $< 60\%$  -WF

## **8. Laboratory Teams**

We will use a CATME survey to assign you to a team of 3-4 students by lab section. We will be using teams in ME 348 for two reasons:

1. The literature on engineering education *repeatedly shows that students learn better when working with each other than when working in isolation or competing against each other.*
2. Working in teams is the principal work mode for most engineers in the real world. Therefore, students need to develop skills in working in teams, including small group communications.

You may be asked to complete periodic team evaluations so that our course instructors and TAs can make sure we are doing everything we can to help your team succeed. Each team should do their own work on labs and homework. Unapproved exchange of rote answers with other teams will be treated as an academic integrity violation.

## **9. Assignment Types:**

**9.1 Individual Homework:** Homework will be assigned on an approximately weekly basis. Homework should be submitted as PDF via Gradescope, which is accessible through Canvas. Unless otherwise announced, homework is due at 11:59 PM Eastern on the **Friday** of each week. **No late homework will be accepted, but the lowest homework is dropped.**

You may work with your colleagues on homework, but each final submission must be an individual effort. Sharing final answers or posting questions/answers online on forums or platforms such as Chegg or AI tools such as ChatGPT are considered violations of academic integrity. **Accessing such platforms to “check” if your answer is correct is also a violation of academic integrity, even if you do not change your answer.** If you have questions, please visit office hours.

**9.2 Individual Pre-Laboratory Assignments:** Prior to each lab, you are required to complete a brief pre-laboratory (“prelab”) assignment that will prepare you to complete the lab. This is to be completed **individually** by each student (i.e., without collaboration with your team or other students) and submitted through Gradescope before your lab section (unless otherwise announced). This is worth 10-20% of each student’s lab grade. **No late prelabs will be accepted, although one prelab is dropped.** The same policy regarding academic integrity as stated above for homework also applies to prelabs.

**9.3 Team Lab Assignments:** Labs will be held at 237 Reber (times vary according to the section that the student is assigned to). Labs are designed such that they can be completed within the allotted 3-hour time. However, to give teams additional time to finalize their answers if needed, labs will be due at **11:59 pm on the day of the lab** (unless otherwise announced). **Lab labs will be accepted only** extenuating circumstances at the discretion of the instructors. The same policy regarding academic integrity as stated above for homework also applies to labs.

Each lab contains an **introduction** that provides background material for the lab to be performed that week. Each week, **before lab class**, students are expected to read the introduction; failure to do so wastes valuable lab time. Every lab report will be submitted with a cover page listing all participating team members. If a team member does not participate, then that person’s name should not appear on the cover page.

*Lab Attendance Policy:* You are expected to attend all labs at their scheduled times and for their full duration. In case of a university-approved absence, make-up of course work may be approved. If a student must miss a lab due to illness, job interviews, or for other acceptable reasons, then they must inform the lab section TA and course instructor as soon as possible. Refer to the university policy on what constitutes a university-approved absence. If a lab is missed without an acceptable excuse, then a grade of zero will be assigned. **To receive a passing grade, students must complete all laboratories at scheduled time or via a makeup session.**

*Lab Participation:* To ensure that all team members are participating, the TA will check during the lab to ensure that each student works together with their partners in both performing the labs and in preparing the lab reports. If a student is not carrying their fair share of the load, *the other team members should contact the instructor and TA immediately to discuss options.* Reasons for deductions in lab participation grade include:

- A student arrives late to the lab or leaves before their lab group is finished with the lab
- A student causes distractions or does not pay attention during lab
- Other (at the discretion of the TA)

*Lab Safety:* You **must** follow all safety procedures outlined here and in the lab manuals themselves whether you are in 237 Reber or operating your Arduino kit in other locations. Safety requirements include (but are not limited to):

- No eating or drinking is permitted in the laboratory.
- The laboratory workspace must be cleaned and restored to the same conditions as when the work session began. Failure to do so may result in a reduction of score.
- Students must always be careful! If at any time a student is unsure of how to operate a piece of equipment, they should ask the instructor or TA for assistance. It is best to ask if unsure about something.
- Excessive force should never be applied to any piece of equipment. For example, if a connector won't connect, a valve is stuck, or a crank won't turn, it should not be forced – the instructor or TA should be asked to assist. This will avoid equipment damage as well as possible personal injury.
- Common sense must be used regarding safety.
- Do not wear loose clothing or jewelry. Tie back long hair. Do not wear open-toed shoes.
- Turn off the power supply to any circuit when reconfiguring its wiring.
- Double check the polarities of any connections you make.
- Keep a consistent wiring color code. A typical convention would be to use red for power and black for ground.
- Do not rest electronics on a conductive table or surface.
- Discharge any buildup of static electricity in your body before touching metal components. Avoid workspaces and clothing that are prone to building static charge.

- Be careful what you touch while troubleshooting. Arduinos usually don't deal with very high voltages, but inductors and capacitors can build up high charges. Be sure to safely discharge any capacitor after use.
- Connect and test one small part at a time as you build complex circuits.
- Know where the nearest first aid kit is. For 237 Reber, this is near the front door to the lab.
- Know where the nearest fire extinguisher is. For 237 Reber, this is in the hallway.
- Know where the nearest eye wash station is. For 237 Reber, this is in the hallway.
- Don't put cords where people can trip on them.
- A complete copy of the University's safety guidelines is posted on the wall in the lab. All students should read these guidelines.

**9.4 Individual Exams:** Two midterm exams will be given during the evening period. More information about exams will be made available closer to the date of midterm 1. The final exam will be given during the university scheduled time. Do not plan to leave campus until after the scheduled exam day and time.

Make-up exams will only be given for situations **APPROVED** by the instructor **PRIOR** to the start of the exam, except under clearly unavoidable and emergency circumstances. **Unapproved absences will result in a grade of (0) for the exam.**

#### **10. Late Assignments:**

No late homework or prelab assignments are accepted without prior approval (for University approved reasons). Note that one homework and one prelab is dropped through the term. Late lab reports may be accepted with instructor approval and a corresponding penalty.

#### **11. Discussion of Graded Work:**

Discussion of grades received on homework, pre lab, lab reports, project milestones, and exams will be considered up to **3 days** after the online release of grades. **Only requests for regrades made through the Gradescope within the 3-day window will be considered.**

#### **12. Student Conduct and Academic Dishonesty**

Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Course grades are the sole basis on which the College of Engineering certifies your degree with the assumption that your course grades are a valid assessment of your own knowledge and abilities. If you have cheated, you have falsified that credential. Therefore, we must have academic integrity expectations to ensure the validity of your grade and your degree. Detailed information on this topic

can be found at <https://www.engr.psu.edu/faculty-staff/academic-integrity.aspx> . Examples are given below:

**USE OF GENERATIVE TECHNOLOGIES (e.g., ChatGPT, etc.):** You must complete this work entirely on your own. You may not assist other students or use any online sites (e.g., Course Hero or Chegg), technologies (e.g., ChatGPT, language translators), tools, or sources that are prohibited. **If you use ideas, images, or word phrases created by another person or by generative technology, you must identify their source.** You may not share any information about, or from, this assessment with others.

**COPYING ON TEST:** Copying in a complicit manner with another student; passing answers via text or email; discussing answers in exam; having someone else complete your exam, etc.

**PLAGIARISM:** The fabrication of information and citations; submitting others work from professional journals, books, articles and papers; submission of other student's papers or lab results or project reports and representing the work as one's own; fabricating in part or total, submissions and citing them falsely, etc.

**ACTS OF AIDING AND ABETTING:** Facilitating acts by others; unauthorized collaboration of work; permitting another to copy from exam; writing a paper for another; inappropriately collaborating on home assignment or exam without permission or when prohibited, etc.

**UNAUTHORIZED POSSESSION:** Of examinations, through purchase or supply; stealing exams; failing to return exams on file; selling exams; photocopying exams; buying exams; any possession of an exam without the custodian's permission, etc.

**SUBMITTING PREVIOUS WORK:** Submitting a paper, case study, lab report or any assignment that had been submitted for credit in a prior class without the knowledge and permission of the instructor.

**TAMPERING WITH WORK:** Changing own or another student's work product such as lab results, papers, or test answers; tampering with work either as a prank or to sabotage another work, etc.

**GHOSTING:** Taking a quiz, an exam, performing a laboratory exercise or similar evaluation in place of another; having another take a quiz, an exam, or perform an exercise or similar evaluation in place of the student, etc.

**ALTERING EXAMS:** When instructor returns graded exams for in class review and subsequently collects them, student changes incorrect answers and seeks favorable grade adjustment asserting that instructor made mistake in grading; other forms may include changing the letter or and/numerical grade on test; obtaining test in discretely, etc.

### **13. Student Office Hours:**

Scheduled student office hours (see schedule on Canvas) are a great way to get to know your instructor and teaching assistants, and to refine your understanding of course concepts. Attendance is highly encouraged! Office hours will be held in-person. If you are unable to attend any of the scheduled hours, please email for an appointment.

Please come to office hours with specific questions regarding difficulties you are having with the course content or otherwise. You should have started the problem, defined your system, and worked as far as you can. Students who have not progressed this far will be asked to come back when they

are farther along. Office hours are NOT the time to start/work on your homework, ask for your answers to be “checked”, or to dispute a grade (see Discussion of Graded Work #10).

#### **14. Classes/Attendance:**

This is a demanding and fast-paced course. Regular attendance and preparation are highly encouraged for achieving success in this class. Completion of the suggested reading prior to attending class is required. Use of recording or communication devices of any kind is not permitted during class without prior permission from the instructor. You are kindly asked to please keep all cell phones on silent mode, and to refrain from texting or browsing, during class time. It is your responsibility to remain informed of the progress of the course. If you miss a class, you are encouraged to find out what you missed and get a copy of class notes from a classmate.

#### **15. Statement Regarding Students with Disabilities:**

Penn State welcomes students with disabilities into the University’s educational programs. Every Penn State campus has an office for students with disabilities. Student Disability Resources (SDR) website provides contact information for every Penn State campus (<http://equity.psu.edu/sdr/disability-coordinator>). For further information, please visit Student Disability Resources website (<http://equity.psu.edu/sdr/>).

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines (<http://equity.psu.edu/sdr/guidelines>).

If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

#### **16. Educational Equity and Reporting Bias:**

Consistent with University Policy AD29, students who believe they have experienced or observed a hate crime, an act of intolerance, discrimination, or harassment that occurs at Penn State are urged to report these incidents as outlined on the University’s Report Bias webpage (<http://equity.psu.edu/reportbias/>)

#### **17. Counseling and Psychological Services:**

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients’ cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

- Counseling and Psychological Services at University Park (CAPS) (<http://studentaffairs.psu.edu/counseling>): 814-863-0395
- Counseling and Psychological Services at Commonwealth Campuses (<http://senate.psu.edu/faculty/counseling-services-at-commonwealth-campuses/>)

- Penn State Crisis Line (24 hours/7 days/week): 877-229-6400 Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741