

PHY 270: Electronics and Instrumentation

Gustavus Adolphus College: Spring 2024

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Office Hours: <https://homepages.gac.edu/~huber/schedule.htm>

Textbook:

Electrical Engineering: Principles and Applications (7th Edition), by Allan R. Hambley. For online resources, including official Student Solutions, see <http://www.pearsonhighered.com/hambley>
Laboratory Manual (for PHY271, co-requisite lab course)

References:

Analog and Digital Electronics for Scientific Application, Dennis Barnaal, (Breton Publishers, 1982)

Digital Electronics: A Practical Approach, William Kleitz, (Pearson, 2008)

Mathematical Handbook of Formulas and Tables, by Murray R. Spiegel (Schaum's Outline Series)

Course Description and Objectives:

This course and lab comprise electronics theory, design, and testing. Topics include basic and specialized circuits, devices and their characteristics, and modern test equipment. Students will learn in a hands-on setting in both a in studio format in groups and in a laboratory format individually.

Course Policies and Evaluation

1. Prerequisites: *Students must have completed PHY-215/216 (The Electromagnetic Universe and Lab) or PHY-171/172 (General Physics II with Calculus and Lab) with a grade of C or better. Students are responsible for informing their instructor at the start of the course if they have not met these prerequisites; failure to do so may lead to dismissal from the course.* Students must be co-registered in PHY-271 (Electronics Lab)

2. Attendance: Students are expected to attend all classes during the scheduled hours. Students are responsible for informing themselves of material and assignments covered during absences. Students must advise the instructor in writing during the first week of class of any scheduled athletic, music, or other college activities that will require their absence during the semester. Such written notice does not imply a waiver of course requirements or an agreement to reschedule exams.

3. Studio Activities: Students will work in assigned groups and roles to build, test, and characterize electronic circuits in a cooperative-learning setting. A worksheet detailing the studio activity will be provided in each class, and each group will complete one worksheet and submit it for a group grade. There will be no make-up for studios missed due to unexcused absence. Failure to follow the assigned group roles will also be cause for a grade reduction.

4. Ask for Help: If you have trouble with any aspect of the course, make sure you let me know as early as possible. By being proactive in reaching out for assistance, I can better help you identify strategies for success. If you have any questions about assignment values, attendance, or other course components that are part of course grades, please contact me before the close of the semester grading period. I will have office hours and welcome the opportunity to talk with you. See <https://homepages.gac.edu/~huber/schedule.htm>

Electronic copy of syllabus can be found in course Moodle page: Hardcopy available on request from instructor

5. Classroom and Lab Environment/Ethos: As is expected in any course in the physics department, each student is asked to work, along with the instructor and their student peers, to develop a culture of cooperation and inclusion within our department. Physics can, at times, be challenging for every one of us, and we all need the respect and support of others. Please do your part in helping to create a positive supportive environment where all members of this classroom community can do their best work.

6. Technology policy: Course documents will be posted on the course Moodle site You may use a laptop/tablet/phone in class, but only to take notes or access class material. Do not use your laptop/tablet/phone to explore the internet, do email, Tweet, visit Facebook, etc. Exceptions may be made to accommodate student disabilities. I may ask that all devices be put away during some class sessions, so please come to class prepared with a pen and paper.

7. Food and Beverages: Because of expensive and sensitive electronic lab equipment, no food will be permitted in the classroom/lab unless there is a medical accommodation. Beverages will be permitted in classroom/lab in a well-sealed container.

8. Course Communication: Students are expected to check their Gustavus email at least once every day to ensure that they receive email messages from their instructor. A complete schedule, assignments and additional resources will be posted on the course Moodle site.

9. Homework: Problems sets will be assigned approximately every week and are due at the beginning of class on the assigned date. Written homework sets should be neat and organized. Legibility and thorough explanations of answers are required. Each student will submit their own assignment, but you are encouraged to discuss and work problems with each other and your instructor. *For “starred” problems in the text, they can be found in the Student Solutions manual at <http://www.pearsonhighered.com/hambley>. You may use this to check a solution that you have already completed, but it is a violation of the Honor Code to copy these solutions and claim them as your own.* As outlined in the Academic Honesty section below, copying from any source, including using answers found from the internet, is considered a violation of the Gustavus Honor code.

10. Late Homework: One late homework assignment will be accepted, up to 48 hours late, without penalty. Subsequent late assignments will incur increasing penalties. *In addition, no assignments will be accepted after the solutions have been posted or the problems have been returned to the class.*

11. Exams: There will be three one-hour exams and a two-hour final exam. Students are expected to arrange in writing with the instructor well in advance to take an exam/quiz at other than the announced time. Requests to reschedule exams/quizzes for non-emergency reasons will be declined. Missed exams for an unexcused absence will result in a score of zero.

12. Preliminary Exam Schedule: (Subject to Change)

Exam 1: Friday, March 1

Exam 2: Friday, April 5

Exam 3: Monday, April 29

Final Exam: Monday, May 20, 3:30-5:30

13. Homework Help/Tutoring: The physics department has tutors available on Sunday through Thursday evenings. If you need assistance, please visit your instructor during office hours or contact him

to schedule other times to meet.

14. Evaluation: Course grades will be assigned using the following scale as a guide:

<i>Hour exams: 35%</i>	94-100 A	74-78 C+
<i>Final Exam: 20%</i>	90-94 A-	70-74 C
<i>Homework: 20%</i>	86-90 B+	66-70 C-
<i>Group & Studio work: 25%</i>	82-86 B	0-66 F
	78-82 B-	

Assignment of the final letter grades will also consider other factors including the instructor's subjective evaluation of attendance, initiative, evidence of improvement, and the quality of independent work.

15. Incompletes: A grade of incomplete may be awarded at the discretion of the instructor, if requested by the student, under the following conditions: 1) the last day to withdraw has passed, 2) and unforeseen circumstances beyond the student's control (usually restricted to illness or family emergency) preclude completion of the remaining work for the course by the semester deadline. Note that poor planning or having a lot of work to complete at the end of the term are not, in fairness to other students, considered circumstances beyond a student's control. This additional time to complete coursework may not extend beyond the final day of the following semester, and earlier limits may be set at the discretion of the instructor.

16. Academic Honesty: Submitting under one's own name work that is merely copied from another individual/source is a violation of the Honor Code. In the context of this course, students are encouraged to collaborate and to discuss their out-of-class assignments. *However, for any graded assignment in this course (e.g. homework, studio exercises, labs, reading quizzes, and exams) it is a violation of the Gustavus Honor Code to copy from other individuals or utilize other sources outside of our textbook or the solutions available in the official Student Solutions manual at <http://www.pearsonhighered.com/hambley>. Some examples of sources that are prohibited are answer books, computer/web software including artificial intelligence engines, web sites with posted solutions, chat or "homework help" sites, or any other similar sources without attribution. This includes using another individual/source for any parts of problems or for 'checking' answers. You should state the integral number/source when using a printed integral table or website such as Wolfram Alpha/Mathematica.* The overarching principle of the Academic Honesty Policy is that students shall submit their own work, in fairness to others and to self. Ask your professor if you have questions about a particular assignment or kind of work. Please make sure you fully understand the rules related to online work, as it pertains to this course. Unauthorized aid during online exams and assignments is every bit as serious and inappropriate as it would be in an in-person course.

The sanction in this course for a violation of the Honor Code involving plagiarism, copying another student on an exam, or other kinds of cheating on a single assignment will usually be a "0" on the plagiarized assignment or exam. For a more significant event, your professor reserves the right to assign you a grade of "F" for the course. In addition, for any Honor Code violation, your professor will notify the Provost's Office. A letter will be generated by the Provost's Office and sent to you. The letter will remain on file. There will be no further consequence, beyond the course penalty and the letter, if you do not commit any further Honor Code violations. Repeat offenses could ultimately lead to dismissal from the College. You have the right to appeal any Honor Code violation through an Honor Board hearing process. Full descriptions of the Academic Honesty Policy and the Honor Code can be found in the

Academic Catalog, online at https://gustavus.edu/general_catalog/current/acainfo.

17. Academic Accommodations: Gustavus Adolphus College is committed to ensuring equitable and inclusive learning environments for all students. If you have a disability and anticipate or experience barriers to equal access, please speak with the accessibility resources staff about your needs. A disability may include mental health, attentional, learning, chronic health, sensory, physical, and/or short-term conditions. When appropriate, staff will guide students and professors in making accommodations to ensure equal access. Accommodations cannot be made retroactively; therefore, to maximize your academic success at Gustavus, please contact them as early as possible. Accessibility resources staff are located in the Academic Support Center (<https://gustavus.edu/asc/accessibility/>) (x7227). Accessibility Resources Coordinator, Corrie Odland (codland@gustavus.edu), can provide further information. ***When accommodations are given, it is the student's responsibility to communicate in advance of deadlines, and work with the professor to satisfy the accommodations each time they are utilized in this course.***

18. Academic Accommodations for Religious Observance: A student whose religious observance conflicts with a course requirement may request an academic accommodation from the instructor. Students should normally make such requests in writing by the end of the second week of classes, but there may be exceptions. Students may also request accommodations for religious traditions surrounding death and dying when the need arises. The Chaplains' Office annually publishes a multifaith holiday calendar with accommodation notations. You can find it here: <https://gustavus.edu/chaplain/multifaith/>. However, this list is not exhaustive and observances are not necessarily days when individuals will not attend work or school. There are also different levels of observance in different traditions. The Chaplains' Office is available for consultation on any requests for accommodation that are not included in their calendar.

19. Multilingual Student Support: Some Gusties grew up “multilingual,” that is, speaking a language (or languages) other than English at home. Your multilingual background is an incredible resource for you, and for our campus, but it can come with some challenges. Faculty Director for Student Academic Success Elizabeth Kubek (ekubek@gustavus.edu) can meet with students to consult about specific assignments and concerns, as well as helping connect with the College's support systems. If you want help developing a specific skill (for example, reading word problems on an exam quickly enough, communicating effectively via email, or revising essays), let your professor know, or email Dr. Kubek to make an in-person or virtual appointment. In addition, the Writing Center (<https://gustavus.edu/writingcenter/>) offers tutoring from peers (some of whom are themselves multilingual) who can help you do your best writing.

20. Mental Wellbeing: The Gustavus community is committed to and cares about all students. Strained relationships, increased anxiety, alcohol or drug problems, feeling down, difficulty concentrating, and/or lack of motivation may affect a student's academic performance or reduce a student's ability to participate in daily activities. If you or someone you know expresses such mental health concerns or experiences a stressful event that can create barriers to learning, Gustavus services are available to assist you, and include online options. You can learn more about the broad range of confidential health services available on campus at <https://gustavus.edu/counseling/> and <https://gustavus.edu/deanofstudents/services/>.

21. Title IX: Sexual Misconduct Prevention and Resources: Gustavus Adolphus College recognizes the dignity of all individuals and promotes respect for all people. As such, we are committed to

providing an environment free of all forms of discrimination including sexual and gender-based discrimination, harassment, and violence like sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone. Resources and support are available; you can learn more online at <https://gustavus.edu/titleix/>.

Please know that if you choose to confide in me, I am required by the College to report to the Title IX Coordinator, because Gustavus and I want to be sure you are connected with all the support the College can offer. Although it is encouraged, you are not required to respond to outreach from the College if you do not want to. You may speak to someone confidentially by contacting the Sexual Assault Response Team (SART/CADA), Chaplains, Counseling Center, or Health Service staff; conversations with these individuals can be kept strictly confidential. SART/CADA can be reached 24 hours a day at 507-933-6868. You can also make a report yourself, including an anonymous report, through the form at <https://gustavus.edu/titleix/>.