Application for Writing in the Discipline Course

Course proposed: Physics 181, Electronics and Instrumentation
Department of Physics and Astronomy

Physics 181 course catalog description

The course catalog description for Physics 181 is:

181 Electronics and Instrumentation. Students study the properties of various circuit components and use them in scientific applications. Topics include linear DC and AC circuits, diodes, transistors, operational amplifiers and photoelectronic devices. Meets for two laboratory sessions and one lecture session each week. Laboratory fee required.

The prerequisites for Physics 181 are Physics 1–4, Math 27, 38 and 39. Physics 2 and 4 are also laboratory courses. The course catalog description for Physics 2 is:

2 Introduction to Physics I Laboratory (.25). Students gain hands-on experience with the topics discussed in Physics I. Additionally, students are introduced to methods of experimentation in physics including good measurement techniques, simple data analysis and scientific writing. Concurrent enrollment in Physics I is required. Laboratory fee required.

On CCC expectations

(a) (b) and (c). Physics 181 is a current course. It is required of the major. Electronics and instrumentation is the primary disciplinary content. This course requires disciplinary rhetoric in two forms: (1) the informal, yet substantiative, observations and explanations in a laboratory notebook and (2) the formal and more concise form of a laboratory report.

(d) The course will involve writing and rewriting of at least one formal report. The rewrite process includes a draft that receives feedback.

(e) This course scaffolds notebook writing by emphasizing different notebook sections in the first few experiments. The notebook itself serves as a scaffold for the formal report. The report is an opportunity to develop ideas that are first explored in the notebook. The first report is due no earlier than a third of the way through the semester (about week 5).

(f) A significant part of the course, and the course grade, relies on written (narrative) work. Laboratory notebooks consist of diagrams, calculations, graphs and written narrative. The written narrative is one-third to two-thirds of the notebook. Reports have the same elements, with the narrative portion being more than two-thirds of the report.

(g) English 5 will be added as a prerequisite to this course.

(h) The CC learning outcomes on writing are incorporated into the syllabus. Outcomes (1) and (2) of Information Evaluation and Research Practices are not emphasized in this
course. Reports in Physics 181 primarily reference the course textbook. Other majors
courses (Physics 180, Physics 140) expect project reports that involve more varied topics
and naturally include these two outcomes.

(i) Information on free writing advising will be included in the syllabus. Reminders for
the CWAC will also be announced (in-class or on the website) before the first and second
laboratory reports are due.

Syllabus

An example syllabus is attached to this application. Sections directly addressing CCC
expectations (d) through (i) are color coded.
Electronics and Instrumentation - Syllabus

Phys 181, Fall 20xx

Instructor               Mari-Anne M. Rosario
Contact info            Galileo 108A, 925-631-4837, mrosario@stmarys-ca.edu
Office hours            TBD
Required Texts          Basic Electronics: An Introduction to Electronics for Science Students,
                        by Curtis Meyer (2010). A lab manual will be provided. It is a modified version
Lab notebook            It must be bound, page numbered, and quad-ruled.
                        Try National Computation Notebook 43-648.
Website                 physics.stmarys-ca.edu has updated course information
Meetings                Lab MW 2:15-5:15 Lecture F 2:15-3:15

Course description

We will investigate the properties and applications of various components circuits and circuit. Topics include: d.c. circuits with a focus on Kirchoff’s laws and voltage dividers; a.c. circuits, particularly RC filters and RLC circuits; semiconductor components with an emphasis on diode and transistor applications; operational amplifier circuits, e.g. the inverting amplifier, differential amplifier, differentiator, and others; and basic digital concepts. Prerequisites: Physics 1-4, Math 27, 38 and 39, English 5.

Course goals and outcomes

This course is an opportunity to

• establish a working knowledge of electronics widely used in scientific research
• improve your experimental skills, and
• gain further experience with mathematical techniques in science and engineering.

This course is also an opportunity to develop your writing skills, following a style expected within physics. This course has the following core curriculum learning outcomes:

1. To recognize and compose readable text, as characterized by clear and careful organization, coherent paragraphs and well-constructed sentences that employ the conventions of standard written English and appropriate diction.
2. To recognize and formulate effective written and oral communication, with an emphasis on the conventions expected within physics. In physics, effective communication of scientific ideas requires incorporating graphs and mathematical expressions within a written or oral narrative.
3. Analyze arguments so as to construct ones that are well supported, well reasoned, and controlled by an exploratory question.
4. Use the process of writing to enhance intellectual discovery and unravel complexities of thought.
5. To follow expected research practices. This includes integrating and citing evidence
appropriately and understanding the concept of intellectual property and practicing academic honesty.

Evaluation

The final grade will be (approximately) based on

- Lab notebook: 35%
- Lab reports (first 8% second 14% third 8%): 30%
- Exams: 35%

Lab notebooks will be graded. Although you will work with a partner, each individual is responsible for the documentation and analysis of the work performed. The grade will be based on performance in carrying out the experiment (assessed in-lab), the experimental results, the quality of the analysis and conclusions, and clarity of the documentation. Although you may have done notebooks before in Physics 2 and 4, the write-ups in this course are more involved. The first few experiments will be structured to emphasize the different sections of the notebook. The “Laboratory Notebook Guidelines” handout will provide more details.

Three formal lab reports will be due. Formal reports are an opportunity to develop and refine the ideas you first explored in the notebook writeup. The majority of the report grade will be based on your understanding of the experiment, with a focus on the quality of the analysis. The grade will also be partially based on your performance in carrying out the experiment (assessed in-lab). The “Report Guidelines” handout will provide more details on what is expected. The second report has a mandatory rewrite. The re-write must be accompanied with instructor and peer-feedback of the first submission.

Three exams will be given. Exams will cover material from lecture and lab.

Attendance and schedule

There are two lab sessions a week. Attendance to lab is required. If you cannot attend, inform me before the lab. If you cannot let me know before, then as soon as is reasonable. The majority of the work will be done during the labs and a significant part of the notebook grade is based on performance.

There is a lecture each Friday. Attendance is not required. Each student is responsible for all information given during class, regardless of whether or not they are present. The lecture will approximately cover and pace the topics investigated in the lab. Although problems will not be due, problems will be assigned and solutions will be given. Exams will be given based on this material.

A tentative schedule for this class:
Center for Writing Across the Curriculum (CWAC)

Free writing advising is available at the CWAC. Students of all levels and disciplines are welcome to drop in or make appointments for one-on-one sessions with Writing Advisers. The where and when: Dante 202, Sunday 5-8pm MTuWTh 2-8pm.

Academic honor code

Saint Mary’s College expects every member of its community to abide by the Academic Honor Code. According to the Code, “Academic dishonesty is a serious violation of College policy because, among other things, it undermines the bonds of trust and honesty between members of the community.” Violations of the Code include but are not limited to acts of plagiarism. For more information, please consult the Student Handbook at http://www.stmarys-ca.edu/your-safety-resources/student-handbook.

Although you will work with others, what you submit should be your own work and reflect your understanding. There is no acceptable reason for your work to look exactly like someone else’s.

Student disability services

Student Disability Services extends reasonable and appropriate accommodations that take into account the context of the course and its essential elements for individuals with qualifying disabilities. Students with disabilities are encouraged to contact the Student Disability Services Office at (925) 631-4358 to set up a confidential appointment to discuss accommodation guidelines and available services. Additional information regarding the services available may be found at the following address on the Saint Marys website: http://www.stmarys-ca.edu/sds