

**Department.:** PHYSICS

**Course number:** PHYS 258W

**Title:** Laboratory in Electricity, Magnetism, and Mechanics

**Credits:** 3

**Contact Person:** George Rawitscher

**Catalog Copy :** 258Z. Laboratory in Electricity, Magnetism, and Mechanics (Q, W, C)

Both semesters. Three credits each semester. One class period, one 3-hour laboratory period, and additional assignments on the theoretical interpretation of experiments. One hour lecture per week. Time by arrangement. A written presentation of methods and results is required for each experiment. Prerequisites: First semester, PHYS 121 or 131 or 141 or 151; Second semester, PHYS 122 or 132 or 142 or 152. Both semesters prerequisite: ENGL 105 or 110 or 111 or 250. Open to sophomores or higher.

Experiments with mechanical phenomena. Experiments with electric and magnetic phenomena, including their interaction with matter. The handling of experimental data. The use of computers in experimental physics.

**W Criteria:** Physics 258Z is a laboratory course required of all physics majors. The course seeks to develop a set of professionally appropriate skills in experimental and laboratory physics. One of the fundamental skills is the written and oral presentation of experimental results and analysis. The writing is discipline specific with the textbook and style manuals for the course being "Scientific English" by Robert Day, the "Reviews of Modern Physics Style Guide" and the "Physical Review Style and Notation Guide". The writing for the course is a set of weekly assignments culminating in a major paper at the end of the semester.

The weekly writing assignment is a 150-200 word abstract of that week's laboratory experiment. The format of the abstract is the same as that for any professional manuscript or journal article. Detailed remarks and suggestions for improvement are communicated to the students about each writing assignment. The opportunity for revision and writing improvement comes in the preparation of the following week's new abstract. This feedback and revision cycle continues throughout the semester with 10 abstracts (5 pages total) being written by the student.

Later in the semester each student is given the choice of one experiment to be written up in the style of a professional journal article. The manuscript has all the elements of a typical journal article; title, abstract, introduction, experimental methods, data analysis, conclusion and references. Students are also expected to construct appropriate tables and graphs with captions as part of their paper. The minimum length of the paper (excluding graphs and tables) is ten pages. The first draft is due at about the ninth week in the semester. The following week the draft is

returned to the student with written commentary and suggestions with the final draft being due at the end of the term.

During the final week of the semester, each student gives either a poster presentation of their written paper or a ten-minute oral presentation to the class. The choice is at the discretion of the instructor. Neither presentation format is writing per-se, but both are very important discipline specific skills needed to effectively communicate the results of scientific inquiry.

The instructional component for developing writing skill in the discipline occurs in several formats. Typically four or five of the weekly one-hour lectures are devoted to writing. An introductory lecture defines the components of good writing in the discipline and discusses how to prepare an abstract. Following the submission of the first abstract, another lecture is devoted to critiquing the writing so that each student can learn from the mistakes and success of their peers. At the midway point in the semester, there is a formal lecture on manuscript preparation, and then a follow-up discussion of common errors and how to fix them after the submission of the first draft. In addition to the formal lectures, each assignment is returned with individualized written commentary to improve the students writing skills. The major paper and the shorter weekly writing assignments enhance the learning of the content of the course by requiring students to clarify and refine their understanding of the laboratory experiment and its interpretation through the writing process.

The syllabus for this course will inform students that they must pass the "W" component of the course in order to pass the course and that the course requires a minimum of fifteen pages of revised and edited writing. The weighting of the "W" components of the class are typically 10% weekly abstracts, 30% final written paper, and 10% oral/poster presentation.

**Role of Grad Students:** Typically 2 senior TAs are used to teach the laboratory components of the course and evaluate the lab performance of the students. They are supervised by the faculty who is in charge of the course.