PHY 210/211 LABORATORY AND TUTORIAL

Physics 210/211 labs provide an opportunity for students to *play around* with the physics learned in class. They are also the first opportunity that students at Saint Mary's get to experience life in a typical small physics class. The spirit in the lab is usually quite high, and surveys indicate that labs are the portion of the course that students enjoy the most. Come to them with that in mind! Remember, however, that there are rules of conduct for the lab, as well as the usual mundane administrative details to be carried out.

The lab/tutorial component of PHY 210/211 is divided into six sections, A through F, with sections grouped into three pairs — A and B, C and D, and E and F — that meet on Monday, Tuesday, and Thursday afternoons, respectively. Each section alternates from one week to another between a session in the laboratory (MM023) and a formal tutorial (MM013). A schedule for all sections for the term is appended. Each section is assigned a professor (instructor), who is responsible for the labs, another instructor who conducts tutorials, and one or two lab demonstrators to assist students in the various aspects of assembling equipment, checking observations, and analyzing data for each experiment. If you find it necessary to change sections, first consult Dr. Ian Short, who is the primary instructor responsible for PHY 210/211 labs. His office is in MM301A.

Attendance

Attendance in all labs and tutorials other than the designated "optional/no labs" sessions is **mandatory**. Students should discuss with instructors *beforehand* the reasons for any lab or tutorial sessions to be missed. It is up to the instructor to decide whether the reason given by the student warrants an excused absence, which avoids the assignment of the grade "0" for that session. A letter from the doctor is normally required in order to be granted an excused absence for medical reasons. At the discretion of the instructor, a student may fail the lab (and thus the course) if too many unexcused absences have occurred.

Tutorials meet in room MM013 from 2:30 p.m. until 5:30 p.m. on the designated afternoon. The tutorial is designed to review class material, to present supplemental material, and most importantly, to solve problems illustrative of typical homework and exam problems. The tutorial is *not* a time for students to do homework problems or to do work related to other courses. Any student using the tutorial inappropriately may be asked to leave, and could be assigned an unexcused "absent" for the session.

The Laboratory

Labs meet in room MM023 from 2:30 p.m. until 5:30 p.m. on the designated afternoon. *Students should arrange themselves in pairs*, with one pair at each lab table. Groups of three students or more are normally not permitted, unless space limitations dictate otherwise.

Prior to the first lab session, students are expected to obtain a variety of items that are essential for work in the lab. The items include: a bound lab notebook (the "A90 Physics Notebook" available from the bookstore), a copy of the PHY 210/211 lab manual (copies can be purchased from the Undergraduate Astronomy & Physics Society in MM014A), pens, pencils (although not an absolute necessity), a scientific calculator (available from *Staples* for less than $10), a transparent ruler, and (for Lab 4) a protractor for measuring angles. Students are also expected to have read the introductory section of the lab manual prior to the

first lab session. *Note: there are instructions in the lab manual pertaining to lab notebooks, and students who have not read the introduction to the lab manual will not be properly prepared for the first lab.* **Every student's preparedness for each lab is recorded by the lab demonstrators, and affects the final lab grade.** Part of the final lab mark may also be based upon short lab quizzes that are given without advance warning during the term (at the lab instructor's discretion), so it always helps to *be prepared.*

Five experiments are completed for each of PHY 210 and PHY 211, and each one is described in the lab manual. All labs are completed during 3-hour lab periods, and lab notebooks are collected at the end of the sessions for grading, to be returned the next week. Each semester students are required to submit formal lab report on one of the labs performed. An example of a formal lab write-up is given in the lab manual. Formal lab reports are assigned to each student by the lab instructor at the times indicated on the lab schedule. Formal lab reports are due two weeks from the date they are assigned. All reports must be generated exclusively from the data in a student's lab notebook, hence the importance of complete write-ups for each lab.

A "make-up week" towards the end of each semester allows students to do or redo one of the previous labs. Credit for any lab completed at that time is given only if the original session was missed because of an excused absence. Although the original lab grade for previously-completed labs is not updated if the lab is redone, redoing a lab may help to provide improved data for a formal lab report, and could result in a higher grade for the lab report than would be the case otherwise.

Lab Grades

in-lab work & lab tests	65%
formal lab reports	35%
total	100%

Informal lab write-ups in student lab books are graded by the lab demonstrators on a scale from 0 to 6. Grades are assigned according to the student's preparation for the lab, completeness of the data, analysis of uncertainties, and the degree of success at attaining the lab goals. A zero (0) is assigned to labs not handed in.

Tutorial attendance counts separately, and is graded P (present) or A (unexcused absence), worth 1 and 0 points, respectively. There are 5 mandatory tutorial sessions each semester.

It is extremely difficult to fail the lab portion of PHY 210/211 if a student is making a conscientious effort. Attendance at labs and tutorials, and making *some* effort, almost by themselves ensure a passing grade.