Modern Physics Lab  
PHY 333.020 & PHY 333.021

Joseph A. Musser, Ph.D.
Professor, Department of Physics, Engineering and Astronomy
Office Hours: MWF 9:30-10:30, M 2:00-4:00, or by appointment
(936) 468-2015, Musserja@sfasu.edu, 207P Ed & Gwen Cole STEM Building
Class meeting time and place: STEM 305, Section 020 - W 12:00-2:50; Section 021 - W 3:00-5:50

Course Description: This is the laboratory course to accompany Modern Physics (PHY 333). Class is one hour credit and meets three hours per week. Corequisite: PHY 333


Grading Policy: The laboratory and lecture grades will be combined to form a single grade for both PHY333 and PHY333L as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
<th>Grade Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Portion</td>
<td>25 %</td>
<td>90-100 %</td>
<td>A</td>
</tr>
<tr>
<td>Exam 1</td>
<td>15 %</td>
<td>80-89 %</td>
<td>B</td>
</tr>
<tr>
<td>Exam 2</td>
<td>15 %</td>
<td>70-79 %</td>
<td>C</td>
</tr>
<tr>
<td>Exam 3</td>
<td>15 %</td>
<td>60-69 %</td>
<td>D</td>
</tr>
<tr>
<td>Final Exam</td>
<td>18 %</td>
<td>&lt; 60 %</td>
<td>F</td>
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<tr>
<td>Homework</td>
<td>12 %</td>
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Individual formal lab write-ups will be graded as follows:

- Abstract: 6 pts.
- Title, Table of Contents: 4 pts.
- Introduction: 10 pts.
- Theory: 10 pts.
- Experimental Procedure: 10 pts.
- Data: 15 pts.
- Graphs & Calculations: 10 pts.
- Analysis and Conclusion: 20 pts.
- Bibliography: 5 pts.
- Overall: 10 pts.

A Student cannot pass the course without passing the lab portion. In other words a student failing the lab portion (a laboratory average of less than 60%) fails the course regardless of what the calculated final numerical average may be.

Late Policy: A penalty of 10% will be applied for labs turned in after 5:00 pm on the due date and an additional 10% for each additional day it is late.

Attendance Policy: There are no makeup labs. If you are going to miss class for a university excused absence you should notify the instructor in advance in writing. It is your responsibility to abide by university guidelines in dealing with your absence.
### Schedule of Experiments

<table>
<thead>
<tr>
<th>Experiment Date</th>
<th>Experiment</th>
<th>Lab Report Due Date</th>
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</thead>
<tbody>
<tr>
<td>September 5th</td>
<td>Statistics</td>
<td>September 19th</td>
</tr>
<tr>
<td>September 12th</td>
<td>Absorption of Radiation</td>
<td>September 26th</td>
</tr>
<tr>
<td>September 19th &amp; 26th</td>
<td>Blackbody Radiation</td>
<td>October 3rd &amp; 10th</td>
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<tr>
<td>October 3rd &amp; 10th</td>
<td>Electrostatic Deflection</td>
<td>October 17th &amp; 24th</td>
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<tr>
<td>October 17th &amp; 24th</td>
<td>Critical Potentials</td>
<td>October 31st &amp; November 7th</td>
</tr>
<tr>
<td>October 31st &amp; November 7th</td>
<td>Electron and X-ray Diffraction</td>
<td>November 14th &amp; 28th</td>
</tr>
<tr>
<td>November 14th</td>
<td>Eigenvalue Problem</td>
<td>December 5th</td>
</tr>
</tbody>
</table>

**Elements of a Good Report:** Avoid Noise: grammar and punctuation errors, unknown terms, filler, unsupported statements, poor page layouts, and poor word usage

Text: use ragged right edge (not justified), use Arial or Times New Roman 12 point font, use 1.5 line spacing, use headings in a different style, justify your claims, show relevance of what you write, build a logical argument

Writing for Readability: write clearly, write short, simple words when they are sufficient, use specific, concrete language, avoid slang or jargon, be concise and avoid redundancy, vary the sentence length, sentences with new ideas should, perhaps, be shorter, sentences used to support an idea can be longer

**Report Requirements:** Each student must turn in their own individually written report. Plagiarism, even from your lab partner, will result in a grade of zero for the lab. The student must use the data they collected. If a student learns their data is not adequate they may (at the lab instructor’s prerogative and convenience) retake data if the lab room is available. All reports should be turned in stapled and in the order listed in the grading section above. The title page should be centered on the first page and include the due date, the title, the lab group members. Procrastination is the enemy of a good report. Get started on your data analysis and report writing during the first week of the experiment. Remember, if you catch mistakes early, you may be able to get back into the lab to redo your measurements. Put serious effort into your lab report writing because your lab average is heavily weighted in your final course average!

**Course Requirements:**
- Each student must conduct the required seven experiments.
- Each laboratory exercise includes a formal laboratory write up which will be due as indicated in the calendar.

**Program Learning Outcomes:** (PLO 4)
1. Knowledge: The student will demonstrate knowledge and comprehension of the basic and applied fields of physics
2. Problem Solving: The student will develop independent problem solving skills
3. Lab Work: The student will develop good experimental technique, including proper setup and care of equipment, conducting experiments and analyzing results in order to observe physical phenomena, assess experimental uncertainty, and make meaningful comparisons between experiment and theory.
4. Written Communications: The student will develop effective written communication skills by clear and concise problem solving, well-structured laboratory reports, and accepted formatting of research papers.

5. Oral Communications: The student will develop effective oral communication skills in oral presentations of problem solution, seminars, and oral presentations at scientific meetings.

6. Professional Development: The student will discover the protocols of the professional physicist by attending meetings or giving papers.

**Student Learning Outcomes:**
By the end of the course, successful students will be able to:

- Demonstrate effective writing skills through written laboratory reports. PLO 4
- Demonstrate good experimental technique in the laboratory by following directions and properly use the equipment in performing the experiments. PLO 3

**Academic Integrity (A-9.1)**
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

**Definition of Academic Dishonesty**
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at [http://www.sfasu.edu/policies/academic_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp)

**Withheld Grades Semester Grades Policy (A-54)**
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Student Code of Conduct: Policy 10.4**
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program. Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This policy applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the
iCare: Early Alert Program at SFA. Information regarding the iCare program is found at https://www.sfasu.edu/judicial/earlyalert.asp or call the office at 936-468-2703.

Students with Disabilities
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.