Physics 131L-021 - Technical Physics 1 Lab  
Spring 2020 – Room 301 STEM Building

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Office Hours: Monday, Tuesday and Wednesday, 2pm-4pm, or by appointment.  
Department: Physics and Astronomy  
Lab Section(021): Meetings: Tuesdays 3:30pm, Room 301 STEM Building

Course Description
Technical Physics I Laboratory - 1 semester hour, 3 hours lab per week. Computation of lecture and laboratory grades into one grade; same grade recorded for both lecture and laboratory. Co-requisite: PHY 131. Lab fee required

Lab Exercises

<table>
<thead>
<tr>
<th>Week</th>
<th>Laboratory</th>
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<tbody>
<tr>
<td>1</td>
<td>Graphical Analysis of Experimental Data</td>
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<tr>
<td>2</td>
<td>Motion in a Straight Line</td>
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<tr>
<td>3</td>
<td>Motion Down an Inclined Plane</td>
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<td>4</td>
<td>Trajectory</td>
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<td>5</td>
<td>Addition of Vectors</td>
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<td>6</td>
<td>The Newton's 2nd Law Project</td>
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<tr>
<td>7</td>
<td>Conservation of Energy</td>
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<td>8</td>
<td>Conservation of Momentum</td>
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<tr>
<td>9</td>
<td>Centripetal Force</td>
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<tr>
<td>10</td>
<td>Archimedes' Principle</td>
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<tr>
<td>11</td>
<td>Phase Changes in Water</td>
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<tr>
<td>12</td>
<td>Thermal Expansion</td>
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<tr>
<td>13</td>
<td>Lab Final Exam in Room 301</td>
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</tbody>
</table>

Grading

| Lab Reports     | 50%  |
| Lab Notebook    | 25%  |
| Final           | 25%  |

The laboratory score is combined with the lecture grade and the same grade assigned for lecture and grade. Students are required to bring his/her textbook, lab manual, and lab notebook to every laboratory session. Much of the lab experiment background will be taken from the textbook by the student.

Lab Reports
Lab reports will be required from each lab experiment. Lab reports are due at the beginning of the following lab period (the next week). Every person is responsible for turning in his/her own individual lab report even if there is group work involved.
Lab Notebook
Each student is required to bring his/her own lab notebook to every lab session. The purpose of the lab notebook is for recording notes about the experiment, data collected during the experiment, drawings, formulas, or anything that is needed to help the student write their lab report that is due the following week. A small loose-leaf binder is preferred. Each experiment should have its own sheet of paper including experiment title and date. Lab notebooks will be turned in for a grade at the end of the semester as part of your overall lab grade. Lab notebooks, ONLY, may be used by the student on the lab final, so take good notes.

Lab Final
The lab final is a comprehensive exam covering all the lab experiments. If you miss a lab, you are responsible for finding out any information needed to answer questions on the lab final before the day of the final.

Attendance Policy
Attendance will be taken each lab period. Make sure to come to class on time because quizzes will be given during the first five minutes of the class period. All unexcused absences will result in a zero for the lab report and quiz for that day. Excused absences must be approved by the instructor list on this syllabus within one week of the missed lab.

Email Communication
All official course communication will be made using your SFA titan account. You must use your SFA email account for all communications. You will be notified via your SFA titan email account about grades and attendance. You can look up your SFA email account or setup email forwarding using this link: https://apache.sfasu.edu/accountman/

Classroom Policies
For the benefit of your fellow students and your instructor, you are expected to practice common courtesy with regard to all course interactions. For example:

- Be considerate toward your classmates and instructor and arrive to class on time.
- Do not leave class early and do not rustle papers in preparation to leave before class is dismissed.
- Avoid classroom distractions. Be attentive in class: stay awake, do not read newspapers, etc.
- If you are late to class or must leave early please inform your instructor in advance (enter or leave quietly, don’t walk across the front of the classroom (use the side aisles) and don’t walk in front of the projector).
- Cell phones, pagers and other communication devices must be turned off during class.
- Play well with others. Be kind and respectful to your fellow students and your teachers.

Use of cell phones in class or causing other classroom distractions will count as one unexcused absence.
Lab reports should include the following sections:

**Title page**
The title and the following are centered on the page: the name of the student, PHY 131 Laboratory, and the date the experiment was performed.

**Purpose**
Present the reason the experiment was conducted, i.e., what laws or methods were studied.

**Materials and Apparatus**
List all apparatus and equipment used in the experiment.

**Procedure**
Provide a detailed, step by step, grammatical description (in paragraph form) of the procedures for the experiment. Include those procedures carried out during the experiment. This statement will be in your own words in sufficient detail that another experimenter may repeat the experiment with similar results.

**Formulas and Sample Calculations**
Record all formulas used during the experiment, including sample calculations; use the data from the experiment for each sample calculation and include units. Show derivations where necessary.

**Data Tables**
Data are recorded during the experiment and must be presented in table format. Each table shall show grid lines. Show the results of any calculation done. Do not use pages from the lab manual in the lab report.

**Graphs**
Each graph shall take up the whole sheet of graph paper and **only one graph per page**. Graphs must include the title of the graph, labels on the x & y axes including units, and draw a best-fit line not a connect-the-dot line. Show tangent lines on graph for calculating slope when required. Use a ruler with a mm scale and protractor! The scale must be indicated on each graph.

**Answers to Questions**
Write out any questions asked and then answer them.

**Conclusion**
The Conclusion is a brief description of the results of the experiment. Include errors and error analysis. State whether the experiment confirms the tested hypothesis.

Reports **MUST BE** typed. Do not put any lab manual sheets in your lab report. **NO PEN!!!!** Use headings above for each section of your report. Do not write on the back of the page. Use superscripts and subscripts in your word processor. It is also recommended to use Equation Editor in Microsoft Word for your equations. If you have Spell Check and Grammar Check, **USE IT!**

**Expected Time Requirements for Class:**
Meets 3 hrs/wk for 15 weeks, and also meets for a 2-hour final examination. This is a problem oriented class and lab with homework problems. The lecture and lab combine for 6 hours of contact time each week and the work outside of classes each week for the combined courses averages much more than 12 hours in working homework problems, reading the book to understand the theories used in lecture and in homework problems and exams, reading the lab manual to prepare for the lab experiments done each week, writing up the lab experiments, and studying for exams which include major exams and possibly short lecture quizzes.

**Academic Integrity (A-9.1)**
Collaboration on examinations, in class assignments, and homework assignments is forbidden except where specifically specified as "Team" activities. For example, homework assignments are not team activities. In general, one team may not
collaborate with another team on “Team” activities. Students violating this policy will be subject to procedures described in the Stephen F. Austin State University Policies and Procedures Manual.

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

Penalties may include no credit or failure in the course.

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.

The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

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.

Acceptable Student Behavior
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 (see the Student Conduct Code, policy D-34.1). 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 prohibition 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 Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed. http://www.sfasu.edu/policies/student_conduct_code.asp

Program Learning Outcomes

1. Demonstrate the ability to apply Newton's Laws to the study of mechanical systems
2. Describe the Laws of Thermodynamics
3. Solve mechanics and thermodynamics problems using conservation principles
**Student Learning Outcomes**

1. The student will demonstrate proficiency in the basic and applied fields of physics.
2. The student will apply physical principles to novel situations, both in the classroom and in research settings.
3. 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. The student will develop effective written and oral communication skills, especially the ability to transmit complex technical information in a clear and concise manner.
5. The student will appreciate the importance and practice of ethics in science.

**General Education Core Curriculum Objectives/Outcomes**

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<thead>
<tr>
<th>Core Objective</th>
<th>Definition</th>
<th>Course Assignment</th>
<th>Date Due in LiveText</th>
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<tbody>
<tr>
<td>Critical Thinking Skills (CO 1)</td>
<td>To include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.</td>
<td>Addressed in Week 2 during development of equations of motion by analytic and observational methods.</td>
<td></td>
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<tr>
<td>Communication Skills (CO 2)</td>
<td>To include effective development, interpretation and expression of ideas though written, oral, and visual communication.</td>
<td>Addressed week in co-requisite 131 lab week 1, the graphical representation of data.</td>
<td></td>
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<tr>
<td>Empirical and Quantitative Skills (CO 3)</td>
<td>To include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.</td>
<td>Addressed in Week 6 in discussing Newton’s Universal Law of Gravitation and its discovery.</td>
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<tr>
<td>Teamwork (CO 4)</td>
<td>To include the ability to consider different points of view and to work</td>
<td>Addressed week 7 in use of Energy to solve different kinematics problems.</td>
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<td>Personal Responsibility</td>
<td>To include the ability to connect choices, actions and consequences to ethical decision-making.</td>
<td>Addressed week 1 while discussing course syllabus.</td>
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<td>Social Responsibility</td>
<td>To include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.</td>
<td>Addressed week 1 while discussing course syllabus.</td>
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