Class Syllabus

http://www.fp.sfasu.edu/phy108/

2018 -19 / Fall Semester
Physics 108/Section 002
Introduction to Engineering/Physics

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Office Hours: 9:30 - 11:30 AM MW
2:30 - 3:30 PM TR

Class meeting place and time: Ed and Gwen Cole STEM Building 201
12:30 AM – 2:20 PM TR

Text: Introduction to Physics for Physics and Engineering Students

Course Description:

Introduction to Engineering/Physics - Three semester hours, two hours lecture and two hours recitation per week. Introductory course on engineering/physics analysis with practice in analyzing and solving problems in physics and engineering. Includes use of computational devices and methods.

Program Learning Outcomes:

There are no specific program learning outcomes for the physics program addressed in this course.

General Education Core Curriculum Objectives/Outcomes:

General Education Core Curriculum Objectives/Outcomes
This course is not included in the general education core curriculum.
Student Learning Outcomes:

- Demonstrate the ability to analyze and solve introductory physics and engineering problems.
- Demonstrate the ability to communicate analysis of problems in a professional manner.
- Exhibit the ability to work in teams effectively.

Text and Materials:

Text: *Introduction to Physics for Physics and Engineering Students*

Course Requirements:

**Portfolio:** A portfolio of all the problems presented in class will be required. The problems must be presented in standard format on engineering paper. The portfolio will count 100 points toward the final grade.

**Exams:** There will be five timed exams this semester. The exam will consist of three or four problems similar to those worked for homework. Each test will be worth a maximum of 100 points toward the final grade. Students will have one week after the exam is returned to discuss any possible error in the grading. After that time no change will be made in the grade.

Grades:

The final grade will be based upon the weighted average of all the grades obtained for the course requirements listed above. The following are the averages required to obtain the grade indicated:

<table>
<thead>
<tr>
<th>Average</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90 - 100</td>
<td>A</td>
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<tr>
<td>80 - 89</td>
<td>B</td>
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<tr>
<td>70 - 79</td>
<td>C</td>
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<tr>
<td>60 - 69</td>
<td>D</td>
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<tr>
<td>0 - 59</td>
<td>F</td>
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</tbody>
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DESCRIPTION OF COURSE CONTENT

AVERAGE SPEED

The definition of average speed is used to solve kinematics problems involving distance and time.
LINEAR MOTION CONSTANT ACCELERATION

The kinematical equations of motion are derived. These equations are used to solve problems involving the parameters of motion (acceleration, distance, speed and time).

FALLING OBJECTS

The kinematical equations of motion are developed for falling objects. These equations are used to solve problems involving the parameters of motion (acceleration due to gravity, distance, speed and time).

MOTION IN TWO DIMENSIONS

The mathematics of vectors is introduced. A description of motion is developed for objects moving in two dimensions. Vectors are used to solve problems involving acceleration, velocity and displacement in two dimensions.

RELATIVE MOTION IN TWO DIMENSIONS

The description of motion in two dimensions is used to solve problems involving the motion of objects with respect to different reference frames.

PROJECTILE MOTION

A process is developed to solve problems related to objects moving near the surface of the Earth acting solely under the influence of gravity.

CONCURRENT FORCES

The concept of force is introduced. The four field forces found in nature are presented. Techniques are presented to show how mechanics problems can be solved using the field forces and defined contact forces. The free body diagram is presented for concurrent forces applied to masses in mechanical systems.

NEWTON'S FIRST LAW & EQUILIBRIUM

The concept of inertia is discussed. The condition for equilibrium is presented in vector form. The use of the free body diagram in solving equilibrium problems for concurrent forces in two dimensions is demonstrated.

SOLVING EQUILIBRIUM PROBLEMS

Techniques for solving equilibrium problems are presented. Several equilibrium problems are solved.
NEWTON'S SECOND LAW

Newton’s second law is presented for the study of the motion of objects in one and two dimensions. The technique of using the free body diagram for helping sum the force on an object is presented.

SOLVING FORCE & ACCELERATION PROBLEMS

Techniques are discussed for the solution of force and acceleration problems. Problems using Newton’s Second Law are solved.

WORK

Work is introduced by using examples in one dimension. The units of work are defined and several one dimensional problems are solved. The calculation of work for two dimensional motion is presented. The scalar product is introduced.

ENERGY

Energy is defined. The types of energy are presented. The Law of Conservation of Energy is presented and the units of energy are discussed.

MECHANICAL ENERGY

The mechanical energy of a system is defined. Kinetic Energy and Potential energy are discussed. The equations for gravitational and elastic potential energy are developed.

CONSERVATION OF ENERGY IN MECHANICAL SYSTEMS

The conservation of energy is used to solve problems associated with mechanical systems. Mechanical systems moving under the influence of gravity are presented. Problems are solved for the system consisting of a mass on a spring.

POWER

Power is defined. Processes where one form of energy is converted to another form of energy are discussed. Processes where work is done are discussed. The use of the conservation of energy to help determine the power generated is presented. The units Watt and horsepower are compared. Several problems that utilize power calculations are solved.
MOMENTUM AND IMPULSE

Momentum is defined. Newton’s Second Law is used to derive the relation between impulse and change in momentum. Examples of the use of the concept of impulse are presented.

CONSERVATION OF MOMENTUM

The nature of collisions is discussed which demonstrate the need for the concept of momentum. The conservation of momentum is presented. Elastic and inelastic collisions are discussed and problems are solved for these type collisions between two objects.

ANGULAR MOTION IN A PLANE

Angular displacement is discussed. The units used to measure angular displacement are presented.

ROTATIONAL KINEMATICS

The equations for the description of rotational motion in a plane are derived. Problems are solved using the equations for rotational kinematics of objects moving in a plane.

RIGID BODY MOTION

Torque and moment of inertia are defined. The relation between torque, moment of inertia and angular acceleration is presented. Problems involving torque, moment of inertia and angular acceleration are solved.

Attendance

If you have an unexcused absence 3 times or late 6 times, your final grade will be reduced one letter grade. If you have 4 unexcused absences, you will receive an “F” in the course. A written and signed notice from an accepted authority is required for an excused absence within three class days of the absence. You have one week to contact your instructor to make up missed work or schedule makeup exams. Make up exams must be made up with in two weeks of missed exam.

ACADEMIC INTEGRITY (A-9.1)

Abiding by university policy on academic integrity is a responsibility of all university faculty and students. Faculty members must promote the components of academic integrity in their instruction, and course syllabi are required to provide information about penalties for cheating and plagiarism as well as the appeal process. *(Much of this information will be provided through internet links.)*
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) falsification or invention of any information, including citations, on an assignment; 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 include, but are not limited to: (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 the Internet or another source; and (3) incorporating the words or ideas of an author into one's paper or presentation without giving the author due credit.

WITHHELD GRADES (A-54)
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 semesters, the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

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/.

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.