PHYSICS DEPARTMENT
COURSE OUTLINE

PHYS 150 TECHNICAL PHYSICS 1

A first course to introduce students to the nature of physics with applications from technology. This is also recommended for students who took Physics 11 several years ago. Various topics including measurements & units, graphical analysis, 1-D kinematics, 1-D dynamics, work & energy are studied with the goal of introducing students to some concepts and the methodology of problem solving and data analysis.

OFFERED:	Q1, Q2
CREDIT:	3
IN-CLASS WORKLOAD:	4 lecture, 2 lab (alt. weeks), 1 seminar
PRE-/CO-REQUISITES:	Math 063 or Math 172 or Math11 or assessment

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REQUIRED MATERIALS:

Physics 150 course material developed in Physics department
Physics 150 lab manual
Scientific calculator (any calculator is acceptable with the exception of personal computers)
Graph paper (must be either 10 lines/inch or millimeter graph paper)

DEPARTMENT POLICIES REGARDING TESTING:

1. Students must write quizzes, tests, midterm tests, etc., on the date and time assigned by the instructor. Instructors are not required to provide make-up tests. At their discretion, instructors may waive a test or provide a make-up test only in the event of documented illness or other extenuating circumstances.

2. The final exam will cover the entire course and will be 3 hours long. As stated in the current college calendar on page 39, " students are expected to write tests and final exams at the scheduled time and place." Exceptions will only be considered due to **emergency** circumstances as outlined in the calendar. Holidays or scheduled flights are not considered to be emergencies.

3. Midterm tests may be discounted from the grading distribution (see below) if all term work, including term tests, labs, seminars, and assignments, has been completed and is **60% or higher**. In this case, the final grade for the course may be based on a combination of the final exam and the lab mark.

DEPARTMENT POLICIES REGARDING LABS:

1. All assigned laboratory exercises and reports must be completed prior to the date of the final exam with an overall grade of 60% in order to obtain credit for this course. A lab may be waived or made up at a later time during the term only in the case of documented illness or other extenuating circumstances.

2. A student who is repeating a Physics course does not have to complete the laboratory exercises a second time if an average lab grade of 70% or better was obtained.

STUDY TIME

It is recommended that between 5 and 10 hours per week (or more for students with a weak background) be spent studying for this course outside of class time.

GRADING

The standard mark distribution for this course is as follows:

Final Exam	50%
Midterms	40%
Lab/Tutorial Work & Assignments	10%
	100%

GRADE SCALE

Final letter grades are normally assigned as follows (subject to above conditions):

Percentage	Letter Grade
95 to 100	A+
90 to 94	A
85 to 89	A-
80 to 84	B+
75 to 79	B
70 to 74	B-
65 to 69	C+
60 to 64	C
50 to 59	D
below 50	F

OULTINE:

1. **Measurement & Units**

- 1.1 Concepts of physics
- 1.2 Accuracy and precision
- 1.3 Significant figures
- 1.4 Scientific notation
- 1.5 Systeme Internationale (SI)
  - 1.5.1 Base units
  - 1.5.2 Prefixes
  - 1.5.3 Derived units
- 1.6 Conversion of units – British Engineering and US Customary units
- 1.7 Problem solving

2. **Graphical Analysis**

- 2.1 Graph construction
  - 2.1.1 Plotting data
  - 2.1.2 Fitting curves to data
- 2.2 Analyzing linear graphs
  - 2.2.1 Determination of slope and intercept
  - 2.2.2 The linear equation
- 2.3 Analyzing non-linear graphs
  - 2.3.1 Recognition of power graphs
  - 2.3.2 Changing variables to produce linear graphs
  - 2.3.3 Writing equations for non-linear graphs

3. **Kinematics in One Dimension**

- 3.1 Kinematic quantities
  - 3.1.1 Vector and scalar quantities
  - 3.1.2 Position, distance and displacement
  - 3.1.3 Average speed and velocity
  - 3.1.4 Acceleration
- 3.2 Kinematic graphs
  - 3.2.1 Position versus time
  - 3.2.2 Displacement versus time
  - 3.2.3 Velocity versus time
- 3.3 Equations of uniformly accelerated motion
  - 3.3.1 Solving kinematic problems
  - 3.3.2 Acceleration due to gravity
  - 3.3.3 Vertical motion near the Earth

4. **Dynamics in One Dimension**

- 4.1 Concept of force
- 4.2 Newton's first law of motion
  - 4.2.1 Concept of inertia
- 4.3 Newton's second law of motion
  - 4.3.1 Dependence of acceleration on net force
  - 4.3.2 Dependence of acceleration on mass
  - 4.3.3 Dependence of net force on mass
  - 4.3.4 Dynamics examples – One-body problems
- 4.4 Newton's third law of motion
  - 4.4.1 Interpretation of examples of the law

5. **Work, Energy and Power**

- 5.1 Work
  - 5.1.1 Definition
  - 5.1.2 Calculating work done by a force
  - 5.1.3 Positive and negative work
- 5.2 Types of Mechanical Energy
  - 5.2.1 Kinetic energy
  - 5.2.2 Gravitational potential energy
  - 5.2.3 Elastic potential energy
- 5.3 Work-Energy Theorem
- 5.4 Conservation of Mechanical Energy
- 5.5 Power and Efficiency