

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title APPLIED PHYSICS I

Code No. PHY 100-3

Program: WATER RESOURCES/PULP & PAPER ENGINEERING TECHNOLOGY

Semester

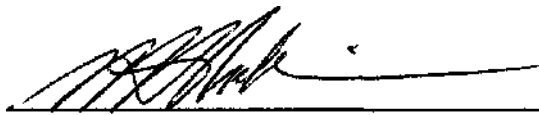
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Author: D. HEGGART

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APPROVED



Chairperson

Date

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CALENDAR DESCRIPTION

APPLIED PHYSICS I

PHY 100-3

COURSE NAME

COURSE NUMBER

PHILOSOPHY/GOALS: This course covers introductory topics such as measurement forms of energy, graphs and their interpretations and vectors. This is followed by a study of mechanics including force and motion, work, energy and power and theory of basic machine. A final unit on the mechanical properties of matter with particular emphasis on liquids, especially water and gases is presented.

METHOD OF EVALUATION (GRADING): Three term tests, one at the end of each of Parts 1, 2 and 3. These tests will have the following weightings:

TEST #1	15 marks	80-100%
TEST #2	35 marks	70- 79%
TEST #3	40 marks	60- 69%
		< 60%
QUIZZES	10 marks	
TOTAL	100 marks	

Eighty percent attendance is required to have the right to write any term test.

TEXTBOOK:

APPLIED PHYSICS I...3

PART I ^ INTRODUCTION, MEASUREMENT AND GRAPHIC METHODS - 12 HOURS

INSTRUCTIONAL OBJECTIVES

1. To develop an understanding of the nature and scope of physics - the study of matter and energy.
2. To relate physics to modern technology and to the work of technicians and semi-professionals•
3. To provide for the student a quick review of some necessary mathematical skills -
- 4- To develop the ability to interpret graphs and to prepare graphs from raw data,
5. To develop the ability to perform simple calculations with a pocket calculator.
6. To develop an understanding of the importance of precision measurement to science, engineering, and technology.
7. To make sure that all students learn the essential units of measurement {length, mass, and time) in both the SI metric system and the English system of measurement.
8. To stress the importance of accuracy in measurements and computations.
9. To provide further practice in the use of the pocket calculator, and in computations generally.
10. To develop the concept of vector and scalar quantities.
11. To understand problems of structures - equilibrium of coplanar forces.
12. To solve force and velocity problems by graphical methods.
13. To understand relationships in concurrent and parallel force systems.
14. To develop the ability to analyze and solve simple relative velocity problems encountered in marine and air navigation.

TEST #1

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PART 2 ^ ^ MECHANICAL PROPERTIES OF MATTER; STRUCTURE OF
MATTER, PROPERTIES OF SOLIDS, LIQUIDS, GASES - 14 HOURS

INSTRUCTIONAL OBJECTIVES:

1. To understand the structure and properties of matter.
2. To appreciate the many evidences which substantiate the kinetic-molecular theory of matter.
3. To understand the relationship between molecular motion and gas pressure.
4. To be able to distinguish elements, compounds, and mixtures.
- 5- To understand the importance of cohesive and adhesive forces in our daily activities and in modern technology.
6. To develop a curiosity about the nature of the forces holding atoms and molecules together.
7. To gain experience in measuring tensile, compressional, twisting, and shearing stresses.
- 8- To become familiar with methods of measuring hardness of substances.
9. To be able to distinguish between mass density and weight density.
10. To understand the relationship between mass-density units and specific gravity-
11. To develop methods for determining the specific gravity of regular and irregular solids.
12. To appreciate the ways that the properties of ductility and malleability are used in industry.
13. To understand the properties of liquids at rest and in motion.
14. To develop methods for determining the specific gravity of liquids.
15. To understand how Pascal's law applies in hydraulic systems.
16. To undertand Archimedes' principle and develop an awareness of how this principle applies in submarines, deep-sea vessels, hydrometers, measurement of specific gravities, etc.

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17. To understand Bernoulli's principle for fluid flow in pipes or channels under steady-state conditions.
18. To understand the reciprocating- and rotary-type fluid pumps.
19. To provide a background regarding programs for flood control, conservation of water resources, and the development of power from impounded water.
20. To understand how the condition of a gas is determined by pressure, volume, and temperature.
21. To understand the operation of liquid pumps that utilize atmospheric pressure.
22. To become aware of the many applications of Bernoulli's principle to gases.
23. To develop an appreciation of how gases are highly important in today's industrial economy.
24. To become aware of current problems of air pollution and of efforts to eliminate causes of air pollution.

TEST #2

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PART _3 - MECHANICS: FORCE, MOTION, WORK, ENERGY, POWER, FRICTION
3 HOURS

INSTRUCTIONAL OBJECTIVES

1. To develop an understanding of distance-time-velocity relationships.
2. To develop an understanding of the relationships governing force and motion, inertia and mass, and impulse and momentum,
3. To be able to solve problems involving the acceleration of gravity and the laws of projectile motion.
4. To engender a thorough understanding of Newton's laws of motion and their relationship to classical physics.
5. To develop an understanding of and correct use of the several systems of units required for the study of applied physics - SI metric (mks) ft-slug-sec, and ft-lb-sec (fps) units.
6. To get all students to the point where they can analyze and solve elementary problems in mechanics.
7. To show the direct application of force and motion principles to practical problems in engineering and industry.
- 8- To develop the concept of energy as a unifying thread in the study of applied physics.
9. To develop an appreciation of the related ideas of the law of conservation of energy and the principle of work.
10. To get all students to understand the relationships between work, energy, and power in modern industry.
11. To develop a thorough understanding of both English (engineering) and SI-metric as used in work-energy-power relationships.
12. To develop further the concepts of momentum, impact, and reaction, as applied to jet engines.
13. To bring about an understanding of the input-output relationships involved in work, energy, and power - the idea of efficiency.
14. To develop the students' ability to set up and solve speedily and accurately elementary problems involving work, energy, and power.
15. To familiarize students with engines and devices that do mechanical work.

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16. To understand the basic principles of the simple machines - how they apply forces and how they do work.
17. To develop skill in analyzing and solving problems from considerations of the principle of work.
18. To bring the student to a full understanding of the concepts of mechanical advantage and efficiency.
19. To develop the ability to solve problems where friction is a factor.
20. To understand the ways in which basic machines are combined to create the complex machines of industry.

TEST #3