



The University of Southern Queensland

Course Specification

Description: Physics and Instrumentation

| Subject | Cat-Nbr | Class | Term | Mode | Units | Campus |
|---------|---------|-------|---------|------|-------|--------|
| PHY | 1911 | 14412 | 2, 2002 | ONC | 1.00 | TWMBA |

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|------------------------|--------|
| Academic Group: | FOSCI |
| Academic Org: | FOS002 |
| HECS Band: | 2 |
| ASCED Code: | 010301 |

STAFFING

Examiner: Brad Carter
Moderator: Jeff Sabburg

RATIONALE

Physics, the study of the laws of nature, provides engineers and technologists with a thorough understanding of the principles behind instrumentation and its use in measurement and other applications. Physics is a fundamental science relevant to many areas of technology in use today and the principles learned will remain relevant, despite future developments in technology. This course provides comprehensive instruction in physics for students intending to become engineering professionals. The programme content follows the guidelines established by the Institution of Engineers, Australia.

SYNOPSIS

Physics is the study of natural laws and its basic principles are directly relevant to many areas of science and technology. This introductory course provides students with an understanding of the theory and application of the laws of physics. Emphasis will be given to the core concepts of physics and how they can be used to solve problems. The major topic areas studied are: Problem Solving; Mechanics, Acoustics, Thermodynamics, Electromagnetism; Circuits; Optics. The course material also features some of the many practical applications of physics and the physical principles at work in instrumentation and measurement systems.

OBJECTIVES

On successful completion of this course students will be able to:

- demonstrate a basic knowledge of physics principles with emphasis on measurement, vectors, kinematics, forces, work, energy, momentum, rotational mechanics, simple harmonic motion, waves, thermodynamics, electric and magnetic fields, electric circuits and geometric optics;

- demonstrate skills and knowledge in the physical principles relevant to instrumentation and measurement systems.

TOPICS

| Description | Weighting (%) |
|---|---------------|
| 1. Problem Solving in Physics; Vectors; Kinematics; Forces; Work and Energy; Linear Momentum; Rotational Mechanics. | 50.00 |
| 2. Simple Harmonic Motion and Waves; Wave Behaviour; Thermodynamics; The Electric Field; The Magnetic Field; Electric Circuits; Geometric Optics Note: The application of physics to instrumentation forms an integral part of the study of the topics listed above. | 50.00 |

TEXT and MATERIALS required to be PURCHASED or ACCESSED:

Books can be ordered by fax or telephone. For costs and further details use the 'Book Search' facility at <http://bookshop.usq.edu.au> by entering the author or title of the text.

Serway, R.A., and Faugh, J.S. 2000, *College Physics: Saunders Core Concepts in College Physics (CD-ROM 3 discs)*, Saunders College Publishing, Fort Worth.

Serway, R.A. and Faugh, J.S. 2000, *College Physics (Technology)*, 5th edition, Saunders College Publishing, Fort Worth.

Serway, R.A. and Faugh, J.S. 2000, *College Physics: Workbook to accompany Saunders core concepts in college physics*, Saunders College Publishing, Fort Worth.

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Giancoli, D.C. 1998, *Physics - Principles with Applications*, 5th edition, Prentice Hall, Upper Saddle River.

Halliday, D., Resnick, R. & Walker, J. 1997, *Fundamentals of Physics*, 5th edition, Jacaranda Wiley, New York.

Wilson, J.D. & Buffa, A.J. 1997, *College Physics*, 3rd edition, Prentice-Hall, Upper Saddle River.

STUDENT WORKLOAD REQUIREMENTS

| ACTIVITY | HOURS |
|----------------|-------|
| Assessment | 20 |
| Directed Study | 64 |
| Examinations | 3 |
| Lectures | 24 |
| Private Study | 48 |
| Tutorial | 12 |

ASSESSMENT DETAILS

| Description | Marks Out of | Wtg(%) | Required | Due Date |
|---------------------|--------------|--------|----------|-----------------------------|
| ASSIGNMENT 1 | 50.00 | 10.00 | Y | 22 Jul 2002 (see note 1) |
| ASSIGNMENT 2 | 50.00 | 10.00 | Y | 22 Jul 2002 (see note 2) |
| 3HR RESTRICTED EXAM | 20.00 | 80.00 | Y | END S2 (see note 3) |

NOTES:

1. Examiner to advise due date.
2. Examiner to advise due date.
3. Examination dates will be available during the Semester. Please refer to the examination timetable when published.

OTHER REQUIREMENTS

- 1 Attendance Requirements It is the students' responsibility to participate actively in all classes scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.
- 2 Requirements to Complete Satisfactorily Each Assessment Item To complete satisfactorily each of the CMA tests students must obtain at least half of the marks available for each CMA tests. To complete satisfactorily the examinations in the course, students must obtain at least half of the marks available for each examination.
- 3 Minimum Requirements to Pass the Course To be assured of a pass in this course, students must: obtain an overall mark of at least 50% obtain at least 50% of the marks available in the examination obtain an overall mark of at least 50% in the other assessments
- 4 Grading Final grades for students will be determined by the addition of the marks obtained in each assessment item, weighted as in the Assessment Details.
- 5 Supplementary and Deferred Examinations Students who obtain an overall passing mark, but who do not perform satisfactorily in an examination, may, at the discretion

of the examiner, be granted a supplementary examination. Students will be granted a deferred examination only if they perform satisfactorily in all other assessment items. Any supplementary or deferred examination for this course will be held at the end of the semester of the next offering of the course.

- 6 Assignments The Due Date for an assignment is the date by which a student must despatch it to the USQ. The onus is on the students to provide proof of the despatch date, if requested by the Examiner. Students must retain a copy of any assignments submitted. This must be produced within 48 hours if required by the Examiner. In accordance with University's Policy on Assignments (Regulation 5.6.1), the Examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances. This policy may be found in the USQ Handbook, the Distance Education Study Guide and the Faculty of Sciences' Orientation Handbook for new on-campus students. All students are advised to study and follow the guidelines associated with this policy. An assignment submitted after the due date without an extension approved by the Examiner, will attract a penalty of up to 20 percent of the assigned mark for each day (or part thereof) that the assignment is late.
 - 7 Examinations Candidates should be aware that the University has policies and regulations (Regulation 5.6.2.2) about the use of unfair means and electronic devices in an examination and they should refer to them to determine whether or not actions they intend to take are acceptable to the University. Restricted Examination: Candidates will be allowed access only to specific materials in a restricted examination. The only materials that students may bring into the restricted examination for this course are: Writing materials (non-electronic and free from materials which could give the student an unfair advantage in the examination); Calculators which cannot hold textual information (students must indicate on their examination paper the make and model of any calculator(s) they use during the examination). With the approval of the Examiner, candidates may take an appropriate non-electronic translation dictionary into the examination. This will be subject to perusal and may be removed from the candidate's possession until appropriate disciplinary action is completed if found to contain material that could give the candidate an unfair advantage. A list of the materials candidates may access in the restricted examination will be on the frontispiece of the examination paper.
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