The University of Southern Queensland

Course specification

Description: Electromagnetic Concepts						
Subject	Cat-nbr	Class	Term	Mode	Units	Campus
PHY	2205	41246	1, 2005	EXT	1.00	Toowoomba

Academic group: FOSCI
Academic org: FOS002
Student contribution band: 2
ASCED code: 010301

STAFFING

Examiner: Jeff Sabburg
Moderator: Brad Carter

REQUISITES

Co-requisite: PHY1104 and MAT1102 or equivalent

RATIONALE

Scientists and Engineers working in many areas depend on electronic equipment and imaging systems for their basic data, and in recent years optical phenomena have formed some of the foundation stones of new industries. This course introduces students to electromagnetic theory, electronic sensors and examines basic optical phenomena as part of the wider discipline of pysics. The course is available to climatology, engineering, science education and mathematics students, as well as those undertaking the Graduate Certificate in Physics.

SYNOPSIS

This course builds upon a concurrent knowledge of both physics and mathematics to consolidate an understanding of electromagnetic theory, geometrical and wave optics for Scientists, Engineers and Science Teachers. Attendance at residential school is not required for this course. Some of the topics covered include Maxwell's equations, A.C. circuits, lens design, optical systems, light scattering, polarization, Fourier optics and applications of microwaves and lasers.

OBJECTIVES

On completion of this course students will be able to:

1. demonstrate an understanding of basic electromagnetic theory;
2. analyse A.C. circuits using the laws applicable to such analysis;
3. carry out calculations for the design of lens systems;
4. explain a range of optical systems and carry out evaluations of them;
5. explain the phenomena of Fourier optics, polarisation and light scattering;
6. described the principles of lasers, holography, time domain reflectometry and synthetic aperture radar; and

7. solve problems relating to the reflection and transmission of microwaves.

TOPICS

	Description	Weighting (%)
1.	Electromagnetic Theory - Maxwell's equations	20.00
2.	Electromagnetic Induction & AC Circuits - R-L-C circuits; Resonance, frequency response.	20.00
3.	Microwave Applications - Time domain reflectometry; Synthetic aperture radar.	20.00
4.	Optical Systems - CCD camera; Monochromators	20.00
5.	Wave Optics - Polarisation and scattering; Fourier optics, lasers and holography.	20.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at http://bookshop.usq.edu.au click 'Semester', then enter your 'Course Code' (no spaces).

Hecht, E 2002, *Optics*, 4th edn, Addison Wesley, Reading.

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, DC 2004, *Physics - Principles with Applications*, 6th edn, Prentice Hall, New Jersey.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assignments	37.00
Examinations	3.00
Private Study	130.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
PROBLEMS	100.00	10.00	01 Mar 2005 (see note 1)
WRITTEN ASSIGNMENT	100.00	10.00	01 Mar 2005 (see note 2)
3 HR RESTRICTED EXAM	100.00	80.00	END S1 (see note 3)

NOTES

1. Problems assessment item covers objectives 1,2,3,7.
2. Written Assignment covers objectives 4,5,6. Examiner to advise details of due date for Written Assignment.
3. Examination dates will be available during the Semester. Please refer to the examination timetable when published.

IMPORTANT ASSESSMENT INFORMATION

1 Attendance requirements:
There are no attendance requirements for this course. However, it is the students' responsibility 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 for students to complete each assessment item satisfactorily:
To complete each of the assignments satisfactorily, students must obtain at least 50% of the marks available for each assignment. To complete the examination satisfactorily, students must obtain at least 50% of the marks available for the examination.

3 Penalties for late submission of required work:
If students submit assignments after the due date without prior approval then a penalty of 20% of the total marks available for the assignment will apply for each working day late.

4 Requirements for student to be awarded a passing grade in the course:
To be assured of receiving a passing grade a student must submit all of the summative assessment items and achieve at least 50% of the aggregate of the available weighted marks for those items.

5 Method used to combine assessment results to attain final grade:
The final grades for students will be assigned on the basis of the aggregate of the weighted marks obtained for each of the summative assessment items in the course.

6 Examination information:
In a Restricted Examination, candidates are allowed access to specific materials during the examination. The only materials that candidates may use in the restricted examination for this course are: writing materials (non-electronic and free from material 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; English translation dictionaries (but not technical dictionaries); Translation dictionary. With the Examiner's approval, candidates may, take an appropriate non- electronic translation dictionary into the examination. This will be subject to perusal and, if it is found to contain annotations or markings that could give the candidate an unfair advantage, it may be

removed from the candidate's possession until the appropriate disciplinary action is completed.

7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.

8 University Regulations:
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL http://www.usq.edu.au/corporateservices/calendar/part5.htm or in the current USQ Handbook.

ASSESSMENT NOTES

9 Students who obtain an overall passing mark, but who do not perform satisfactorily in the examination, may, at the discretionof the examiner, be granted a supplementary examination. Students will be granted a deferred examination only if they perform satisfactorily in all other assessment items.

10 The due date for assessments is the date by which a student must despatch an assignment to the USQ. The onus is on the student 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.