



The University of Southern Queensland

Course Specification

Description: Advanced Topics in Physics

Subject	Cat-Nbr	Class	Term	Mode	Units	Campus
PHY	3302	14408	2, 2002	ONC	1.00	TWMBBA

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

STAFFING

Examiner: Alfio Parisi
Moderator: Jeff Sabburg

PRE-REQUISITES

Pre-requisite: MAT 1102

OTHER-REQUISITES

Pre-requisite: Completion of 2nd level Physics courses and MAT1102

RATIONALE

This course provides students with an in-depth study of selected topics in Physics.

SYNOPSIS

Three topics are offered and may be selected from Microwave Applications, Geophysics, UV Radiation and Astrophysics. Each topic builds on some of the material in previous courses and provides examples of in- depth applications. Microwave Applications will discuss the physics of Environmental Remote Sensing and Solid State Measurements. The Geophysics section will include topics in Seismology, Gravity, Magnetism, and Electrical Properties. The UV radiation section will include topics on solar UV, Spectroradiometry, broad band metres and UV dosimetry. The Astrophysics section will discuss the Sun and other stars. For each section, a series of compulsory practical exercises are undertaken to demonstrate the principles involved.

OBJECTIVES

Dependent on the topics offered, on completion of this course students will be able to:

- work problems in reflection and transmission of microwaves using a numerical maths package;

- rectify and evaluate Synthetic Aperture Radar (SAR) data using image processing software;
- calculate the dielectric constant of a homogeneous material using an appropriate computer program;
- explain the operation of a SAR, Time-domain Reflectometer (TDR), Network Analyser, Weather Radar or GPS;
- apply some of the principles and techniques of physics to the collection, processing, and elementary interpretation of geophysical data;
- apply radiometric, dosimetric & spectroradiometric techniques for ultraviolet radiation measurements;
- gain the ability to solve selected problems in Astrophysics;
- demonstrate skills and knowledge required to perform laboratory experiments safely with appropriate equipment.

TOPICS

Description	Weighting (%)
1. Three topics from: Microwave Applications	25.00
2. Geophysics	25.00
3. Solar UV Radiation Physics	25.00
4. Astrophysics	25.00

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.

PHY3302 Laboratory manual *Advanced Topics in Physics*, USQ,

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.

Cook, C. & Beinfeld, M. 1993, *Radar Signals: An introduction to theory and application*, Artech House, Boston.

Cronin, N.J. 1995, *Microwave and optical waveguides*, Institute of Physics, Bristol.

Kearey, P. & Brooks, M. 1991, *An Introduction to Geophysical Exploration*, Blackwell, Oxford.

Kraus, J.D. 1995, *Electromagnetics: with applications*, 5th edition, McGraw-Hill, Boston.

Morrison, D., Wolff, S. & Fraknoi, A. *Abell's Exploration of the Universe*, 7th edition, Saunders College Publishing, Philadelphia.

Ulaby, F.T., Moore, R.K. & Fung, A.K. 1981, *Microwave Remote Sensing*, Addison Wesley, Reading, Mass. Vol 1-3.

(Years 1981, 1982 and 1986 and Volumes I, II, III.)

Van de Roer, T.G. 1994, *Microwave Technology Series (Microwave electronic devices)*, Chapman and Hall, London, Vol 10.

Veley, V. 1987, *Modern Microwave Technology*, Prentice Hall, Englewood Cliffs.

Zeilik, M. & Gregory, S.A. 1998, *Introductory Astronomy & Astrophysics*, 4th edition, Saunders College Publishing, Forth Worth.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Examinations	6
Laboratory or Practical Classes	26
Lectures	26
Private Study	87
Report Writing	20

ASSESSMENT DETAILS

Description	Marks Out of	Wtg(%)	Required	Due Date
LABORATORY REPORTS	100.00	40.00	Y	22 Jul 2002 (see note 1)
2 HR RESTRICTED TEST	100.00	20.00	Y	22 Jul 2002 (see note 2)
2 HR RESTRICTED TEST	100.00	20.00	Y	22 Jul 2002 (see note 3)
2 HR RESTRICTED EXAM	100.00	20.00	Y	END S2 (see note 4)

NOTES:

1. Examiner will advise early in Semester of the due dates for reports.
2. Examiner will advise date of the 2hr restricted test early in Semester.
3. Examiner will advise date of the 2hr restricted test early in Semester.
4. 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. Students must attend at least 80% of the practical classes in this course to be able to satisfy the practical requirements of Objective 9.

- 2 Requirements to Complete Satisfactorily Each Assessment Item To complete satisfactorily each of the laboratory reports students must obtain at least half of the marks available for them. 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%; and obtain at least 50% of the marks available in the examination; and 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 during the examination period at the end of semester of the next offering of this 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 student to provide proof of the despatch date, if requested by the Examiner. Students must retain a copy of each item submitted for assessment. This must be produced within 48 hours if required by the Examiner. In accordance with the 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 Student 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 20% 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 candidates may use in 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 materials candidates may access in the restricted examination will be on the frontispiece of the examination paper.
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