



The University of Southern Queensland

Course specification

Description: Advanced Topics in Physics

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
PHY	3302	34359	2, 2004	ONC	1.00	TWMBA

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

STAFFING

Examiner: Alfio Parisi
Moderator: Jeff Sabburg

REQUISITES

Pre-requisite: MAT1102

OTHER-REQUISITES

Recommended prior study: MAT2100 and Completion of 2nd level Physics courses

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:

1. solve problems in reflection and transmission of microwaves using a numerical maths package;
2. rectify and evaluate Synthetic Aperture Radar (SAR) data using image processing software;
3. calculate the dielectric constant of a homogeneous material using an appropriate computer program;
4. explain the operation of a SAR, Time-domain Reflectometer (TDR), Network Analyser;
5. apply some of the principles and techniques of physics to the collection, processing, and elementary interpretation of geophysical data;
6. apply radiometric, dosimetric & spectroradiometric techniques for ultraviolet radiation measurements;
7. solve selected problems in Astrophysics;
8. demonstrate skills and knowledge required to perform laboratory experiments safely with appropriate equipment.

TOPICS

Description	Weighting (%)
1. The Examiner will select three topics from Microwave Applications, Geophysics, Solar UV Radiation Physics and Astrophysics.	100.00

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).

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, NJ 1995, *Microwave and optical waveguides*, Institute of Physics, Bristol.

Kraus, JD 1999, *Electromagnetics: with applications*, 5th edn, WCB McGraw-Hill, Boston.

Morrison, D, Wolff, S & Fraknoi, A 1995, *Abell's Exploration of the Universe*, 7th edn, Saunders College Publishing, Philadelphia.

Parisi, AV, Sabburg, J & Kimlin, MG 2004, *Scattered and Filtered Solar UV Measurements*, Kluwer Publishers,

(in press)

Ulaby, FT, Moore, RK & Fung, AK 1981, *Microwave Remote Sensing*, Addison Wesley, Reading, Mass, Vol 1-3.

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

Van de Roer, TG 1994, *Microwave Technology Series*, Chapman and Hall, London, Vol 10.

(Microwave electronic devices)

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

Zeilik, M & Gregory, SA 1998, *Introductory Astronomy & Astrophysics*, 4th edn, Saunders College Publishing, Fort Worth, Texas.

STUDENT WORKLOAD REQUIREMENTS:

ACTIVITY	HOURS
Examinations	6.00
Lectures or Laboratory Classes	24.00
Private Study	111.00
Report Writing	24.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
LABORATORY REPORTS	40.00	40.00	20 Jul 2004 (see note 1)
1 HR RESTRICTED TEST	20.00	20.00	20 Jul 2004 (see note 2)
2 HR RESTRICTED EXAM	40.00	40.00	END S2 (see note 3)

NOTES:

1. Lecturer will advise early in Semester of the due dates for reports.
2. Lecturer will advise date of the 1hr restricted test early in Semester.
3. Examination dates will be available during the Semester. Please refer to the examination timetable when published.

IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:

It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) 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 for students to complete each assessment item satisfactorily:
To complete the practical component satisfactorily, students must achieve at least 50% in the practical reports (using their own results) and obtain at least 50% of the marks available for each report submitted.
- 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 gained by the student 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, achieve at least 50% in the examination and at least 50% of the available weighted marks for the summative assessment 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 weighted aggregate of the 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. With the Examiner's approval, candidates may, take an appropriate non- electronic translation dictionary (but not technical dictionaries) 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 In order to attend laboratory classes, students must provide and wear appropriate personal protective equipment. This shall include closed in shoes. Such equipment must be approved by supervising staff. Failure to provide and wear the appropriate safety equipment will result in students being excluded from classes.

10 The due date for an assignment is the date by which a student must despatch the 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 each item submitted for assessment. If requested by the Examiner, students will be required to provide a copy of assignments submitted for assessment purposes. Such copies should be despatched to USQ within 24 hours of receipt of a request being made. The examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.