



The University of Southern Queensland

## Course specification

### Description: Optical Physics

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
PHY	2202	34362	2, 2004	ONC	1.00	TWMBA

<b>Academic group:</b>	FOSCI
<b>Academic org:</b>	FOS002
<b>Student contribution band:</b>	2
<b>ASCED code:</b>	010301

### STAFFING

Examiner: Jeff Sabburg

Moderator: Brad Carter

### REQUISITES

Pre-requisite: (MAT1100 or MAT1102) and (PHY1103 or PHY1104)

### RATIONALE

Scientists working in many areas depend on imaging systems for their basic data, and optical phenomena have, in recent years, formed some of the foundation stones of new industries. This course examines basic optical phenomena as part of the wider discipline of physics.

### SYNOPSIS

Geometrical Optics: reflection, refraction, lenses, mirrors, aberrations, lens design and optical systems. Wave Optics: interference, coherence, diffraction, light scattering, polarization and application of lasers.

### OBJECTIVES

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

1. analyse geometrical and wave optical systems and solve relevant problems using the laws applicable to such analysis;
2. describe their understanding of optical theory at an appropriate level;
3. demonstrate skills and knowledge required to perform laboratory experiments safely with appropriate equipment.

## TOPICS

	Description	Weighting (%)
1.	Wave motion	10.00
2.	Electromagnetic theory	10.00
3.	Meteorological optics	8.00
4.	Geometrical optics	16.00
5.	Optical systems	8.00
6.	Superposition theory	8.00
7.	Polarisation	8.00
8.	Interference	8.00
9.	Diffraction	8.00
10.	Fourier optics	8.00
11.	Lasers & holography	8.00

### **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.

Parisi, A 2004, *Laboratory Manual for Foundation Physics*, University of Southern Queensland, Toowoomba.

Sabburg, J 2004, *Laboratory Manual for Optical Physics*, University of Southern Queensland, Toowoomba.

### **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.

Lynch, D K & Livingston, W 2001, *Color and light in nature*, Cambridge University Press, New York.

Meyer-Arendt, J R 1995, *Introduction to Classical and Modern Optics*, 4th edn, Prentice Hall, New Jersey, USA.

Parisi, A V, Sabburg, J & Kimlin, M G 2004, *Scattered and Filtered Solar UV Measurements*, Kluwer Publishers, (in press)

Pedrotti, F and Pedrotti, L 1993, *Introduction to Optics*, 2nd edn, Prentice Hall, New Jersey, USA.

Rieke, G H 2003, *Detection of light: from the ultraviolet to the submillimeter*, 2nd edn, Cambridge University Press, New York.

### **STUDENT WORKLOAD REQUIREMENTS:**

ACTIVITY	HOURS
Examinations	3.00
Laboratory or Practical Classes	12.00
Lectures	24.00
Private Study	99.00
Report Writing	20.00
Tutorial	12.00

### **ASSESSMENT DETAILS**

Description	Marks out of	Wtg(%)	Due date
LABORATORY REPORT	100.00	30.00	20 Jul 2004 (see note 1)
ASSIGNMENT	100.00	10.00	20 Jul 2004 (see note 2)
3HR RESTRICTED EXAM	100.00	60.00	END S2 (see note 3)

#### **NOTES:**

1. Examiner will advise due date for Laboratory Report
2. Examiner will advise of due date for Assignment
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 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. To complete the practical component satisfactorily, students must submit 80% of nominated practical reports and obtain at least 50% of the marks available for each report submitted. Students must satisfy Objective 3 by including signed results sheets with their laboratory reports.

- 3 Penalties for late submission of required work:  
If students submit assignments/laboratory reports 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 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.

- 10 The due date for an assignment/laboratory report 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. This must be produced within 24 hours if required by the Examiner.
- 11 In order to attend laboratory classes, students must provide and wear appropriate personal protective equipment. This may include a laboratory coat, closed in shoes, and safety glasses. 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.