



The University of Southern Queensland

Course specification

This version produced 20 Dec 2007.

The current and official versions of the course specifications are available on the web at
<<http://www.usq.edu.au/coursespecification/current>>.

Please consult the web for updates that may occur during the year.

Description: Astrophysics

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
PHY	2204	62986	1, 2007	EXT	1.00	Toowoomba

Academic group:	FOSCI
Academic org:	FOS002
Student contribution band:	2
ASCED code:	010303

STAFFING

Examiner: Brad Carter

Moderator: Alfio Parisi

OTHER REQUISITES

Students will require access to e-mail and internet access to USQConnect for this course.

RATIONALE

Astrophysics is the branch of astronomy that deals with the physics of the universe. Astrophysics enhances, unifies and illustrates the study of physics, by demonstrating how physics provides fundamental understanding of a wide range of astronomical objects and processes. This course is intended for physics majors and others interested in the behaviour of the Sun and stars. It aims to provide physical insight into the Sun and its atmosphere and activity, and how the Sun and other stars evolve over time. It includes study of the origins of stars, why they shine, how they can vary in brightness, and how their mass determines their fate. Students also gain an appreciation of how classical and modern physics are combined to understand the stars, and learn some of the techniques involved in the scientific method, through use of a robotic telescope at Mt Kent Observatory.

SYNOPSIS

This course in astrophysics aims to provide a physical explanation of the Sun and stars. The Sun is our local star and one that is of great important to us. In addition, the Sun can inform us about other stars, and conversely, stellar studies can provide insight into the Sun's past, present behaviour and future. This course thus aims to provide a physical understanding of stars, with particular reference to our Sun. Access to a robotic telescope at Mt Kent Observatory is provided as part of this course, so that some practical experience can be gained in observational stellar astrophysics. This course begins with an introduction to how we can determine the basic properties of a star. It then addresses the question of how the stars shine, before focusing on the nature of the Sun, and its activity. This is followed by studies of stellar evolution, from star formation to the late stages of a star's life. The course concludes by investigating the different death scenarios for stars of different mass, and the resulting white dwarf, neutron star or black hole.

OBJECTIVES

On completion of this course students will be able to:

1. demonstrate how key stellar properties are measured (cma1, exam)
2. demonstrate how stellar atmospheres are studied (cma1, exam)
3. demonstrate how stellar interiors are studied (cma1, exam)
4. describe the solar interior, atmosphere and cycle (cma1, exam)
5. review star formation (cma1, exam)
6. review post-main sequence stellar evolution (cma2, exam)
7. review stellar pulsation (cma2, exam)
8. describe supernovae (cma2, exam)
9. describe white dwarfs & neutron stars (cma2, exam)
10. describe black holes (cma2, exam)
11. develop an observing proposal (assignment)

TOPICS

	Description	Weighting (%)
1.	Observational Astrophysics	10.00
2.	Stellar Atmospheres	10.00
3.	Stellar Interiors	10.00
4.	Solar Astrophysics	10.00
5.	The Process of Star Formation	10.00
6.	Post Main-Sequence Stellar Evolution	10.00
7.	Stellar Pulsation	10.00
8.	Supernovae	10.00
9.	White Dwarfs & Neutron Stars	10.00
10.	Black Holes	10.00

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).

Ostlie, D A. and Carroll, B. W 2007, *An Introduction to Modern Stellar Astrophysics*, 2nd edn, Pearson Education / Addison Wesley-Benjamin, Cummings, USA.

(<http://www.aw-bc.com/catalog/academic/product/0,1144,0805303480,00.html> Students will require access to e-mail and web access including USQConnect for this course.)

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.

Carroll BW and Ostlie DA 1996, *An introduction to modern astrophysics*, 1st edn, Addison-Wesley Publishing Co, Reading, MA.

Cole GH & Woolfson MM 2002, *Planetary Science: The Science of Planets Arounds Stars*, 1st edn, Institute of Physics Publishing, Bristol and Philadelphia.

(www.iop.org)

Hartmann, William K & Impey, Chris 2002, *Astronomy: The Cosmic Journey*, 6th edn, Brooks/Cole, London.

(www.brookscole.com/astronomy_d)

Kitchin, Cr 2003, *Astrophysical Techniques*, 4th edn, Institute of Physics Publishing, Bristol and Philadelphia.

(www.iop.org)

Zeilik, M. & Gregory, SA 1998, *Introductory Astronomy & Astrophysics*, 4th edn, Brooks/Cole, USA.

(www.brookscole.com/astronomy_d)

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assignments	24.00
Computer Managed Assessment	24.00
Examinations	2.00
Field Trips or Excursions	4.00
Laboratory	24.00
Lectures	12.00
Private Study	72.00
Tutorials	12.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
ASSIGNMENT	20.00	20.00	30 Mar 2007 (see note 1)
COMPUTER MARKED ASSIGNMENT 1	10.00	10.00	27 Apr 2007 (see note 2)
COMPUTER MARKED ASSIGNMENT 2	10.00	10.00	08 Jun 2007 (see note 3)
2 HR RESTRICTED EXAM	60.00	60.00	END S1 (see note 4)

NOTES

1. Assignment is due in week 4
2. Due in week 8.
3. Due in week 14
4. 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 satisfactorily complete an assessment item a student must achieve at least 50% of the marks or a grade of at least C. Students do not have to satisfactorily complete each assessment item to be awarded a passing grade in this course. Refer to Statement 4 below for the requirements to receive a passing grade in this course.
- 3 Penalties for late submission of required work:
If students submit assignments after the due date without prior approval then a penalty of 10% 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 achieve at least 50% in the examination and at least 50% of the total weighted marks available for the course.
- 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:
Candidates are allowed access only to specific materials during 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 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).
- 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 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.
- 10 In accordance with University Policy, the Examiner may grant an extension of the due date of an assignment in extenuating circumstances.
- 11 The Faculty will NOT accept submission of assignments by facsimile.
- 12 Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements.
- 13 In the event that a due date for an assignment falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.
- 14 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination); IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).
- 15 Students may be required to provide a copy of assignments submitted for assessment purposes. Such copies should be dispatched to the USQ within 24 hours of receipt of a request to do so.

OTHER REQUIREMENTS

- 1 Students will require access to e-mail and internet access to USQConnect for this course. Astronomical observation will be done using a robotic telescope remotely accessible over web. Please note that this will be queue-scheduled "robotic observing" not live "remote observing". Observing requests submitted over the web will be scheduled and images taken when possible. For more information and updates when available please see www.usq.edu.au/astronomy or the course page at www.usq.edu.au/users/carterb/phy2204.