ASTR170

Introductory Astronomy: Our Place in the Universe

S1 Day 2016

Dept of Physics and Astronomy

Contents

General Information	2
Learning Outcomes	3
General Assessment Information	3
Assessment Tasks	4
Delivery and Resources	6
Unit Schedule	7
Policies and Procedures	7
Graduate Capabilities	8

General Information

Unit convenor and teaching staff
Unit Convenor
Mark Wardle
mark.wardle@mq.edu.au
Contact via Email
E6B 2.702

Lecturer
Joanne Dawson
joanne.dawson@mq.edu.au
Contact via Email
E6B 2.603

Lecturer
Richard McDermid
richard.mcdermid@mq.edu.au
Contact via Email
E6B 2.603

Lab Manager
Adam Joyce
adam.joyce@mq.edu.au
Contact via Email
E7B 214

Credit points
3

Prerequisites

Corequisites

Co-badged status

Unit description
This is a foundation unit in astronomy, suitable for aspiring physicists/astronomers and non-scientists alike. No prior knowledge of astronomy or physics is required. This unit gives a broad underpinning of basic astronomical subjects and concepts with minimal mathematical content. A diverse range of astronomical topics are covered, starting with the solar system, including comets and asteroids; and then increasing in scale to Galactic stars, nebulae, the interstellar medium, our own Milky Way galaxy, galaxy clusters, quasars, black holes and basic cosmology. Key fundamental physical principles, theories and observational technologies are covered. Experimental work is both hands-on and computer based, and covers such areas as galaxy classification, eclipses, spectroscopy and geometrical optics. A session at the Macquarie University Observatory forms a recommended part of the practical work.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

Knowledge of the layout and contents of the solar system.

Knowledge of the structure and lifecycle of stars, including our Sun.

Knowledge of how galaxies form, their basic structure and how they relate to the cosmology of the universe.

Demonstrate understanding of practical and conceptual topics in observational astronomy.

Be able to conduct, analyse, and draw conclusions from hands-on experimental work.

Be able to discuss the implications of funding scientific research.

General Assessment Information

Satisfactory completion of the assessment in each of the categories of Assignments, Labs, and Final Exam is required to pass the unit.

ASTR170 Late Submission Policy

Assessments received after the deadline will be subject to a 10% deduction for each day, or part-day, late. (So, e.g. 0–24 hours late = 10% deduction; 24–48 hours late = 20% deduction, etc). Work will not be accepted more than 5 days (120 hours) after the due date and time.

Note: extensions to due dates may be granted if a Disruption to Studies is submitted and approved.

See http://students.mq.edu.au/student_admin/exams/disruption_to_studies/

Assessment Tasks

Name	Weighting	Due
Assignments	20%	See below
Essay	10%	Friday 6 May 5pm
Labs	30%	See below
Final exam	40%	University Examination Period

Assignments

Due: **See below**
Weighting: **20%**

There will be five (5) assignments on the concepts covered in the lectures. One of the assignments will require observing the sky at night. Assignments must be submitted on iLearn. The due dates are:

- Assignment 1 - Friday 18 March 5pm
- Assignment 2 - Friday 8 April 5pm
- Assignment 3 - Friday 13 May 5pm
- Assignment 4 - Friday 3 June 5pm
- Assignment 5 (observatory) - Friday 10 June 5pm

On successful completion you will be able to:

- Knowledge of the layout and contents of the solar system.
- Knowledge of the structure and lifecycle of stars, including our Sun.
- Knowledge of how galaxies form, their basic structure and how they relate to the cosmology of the universe.
- Demonstrate understanding of practical and conceptual topics in observational astronomy.
- Be able to conduct, analyse, and draw conclusions from hands-on experimental work.

Essay

Due: **Friday 6 May 5pm**
Weighting: **10%**

A 1000-1500 word essay addressing the question below is to be submitted electronically via iLearn. It must be typed.

Australia is aiming to co-host the $1-2 billion Square Kilometre Array (SKA), the largest ground-based astronomical infrastructure ever funded. In this assignment your task is to discuss the ethics, social responsibility and perceived value of pure astronomical research in today's world. For example, should there always be a commercial expectation of government funded research?

On successful completion you will be able to:

- Be able to discuss the implications of funding scientific research.

Labs

Due: **See below**
Weighting: **30%**

Lab attendance is required. Each student must attend five (5) practical sessions and complete five (5) laboratory exercises starting in Week 4. The lab assessment is based on in-lab work only.

On successful completion you will be able to:

- Demonstrate understanding of practical and conceptual topics in observational astronomy.
- Be able to conduct, analyse, and draw conclusions from hands-on experimental work.

Final exam

Due: **University Examination Period**
Weighting: **40%**

A three-hour final exam consisting of multichoice and short-answer questions will take place in the exam period of semester 2. No material will be allowed in the exam room.

On successful completion you will be able to:

- Knowledge of the layout and contents of the solar system.
- Knowledge of the structure and lifecycle of stars, including our Sun.
- Knowledge of how galaxies form, their basic structure and how they relate to the cosmology of the universe.
- Demonstrate understanding of practical and conceptual topics in observational

astronomy.

Delivery and Resources

External vs Day Offerings

This unit is offered in S1, in Day and External modes. The only difference between these modes is that students enrolled in the external mode are not formally entitled to attend lectures. The lectures will be recorded and available on line along with the slides. Students enrolled in the "External" offering are also very welcome -- nay, encouraged -- to attend lectures. If room space is tight we will send out an iLearn announcement warning external enrolees that we cannot guarantee a lecture seat for the first few weeks of the semester.

Note that students enrolled in the external offering are still required to enrol in and attend a weekly lab session (see below).

Lectures

Lectures are held in X5B T1 on Tuesdays from 12-1pm and Fridays from 11am-1pm.

Lectures are automatically recorded and will be available on iLearn, along with the lecture slides.

Labs

The lab is located in E7B 209-213. Each student is required to sign up for one of the lab streams:

- Monday 10am-12pm
- Monday 2-4pm
- Tuesday 10am-12pm
- Thursday 10-12pm
- Friday 1-3pm
- Friday 3-5pm

In Week 2 we will hold special planetarium sessions during the labs. Normal labs start in Week 4 for the Monday, Tuesday, Thursday streams, and in Week 5 for the Friday stream (because of the Easter break).

A mandatory lab notebook will be available from the bookstore in Week 3.

Please note that health and safety regulations specify that fully-enclosed footwear must be worn in the labs. (i.e. you will not be admitted if you are wearing sandals etc...).

Textbook

The lectures are based upon the following textbook, which is not absolutely required but *strongly* recommended to enhance the learning process:

Foundations of Astronomy, 13th Edition Michael A. Seeds and Dana Backman ISBN-10: 1305079159 | ISBN-13: 9781305079151

This can be purchased from the Macquarie bookstore. Earlier editions of the textbook are OK.

Unit Schedule

Week	Lecturer	Topic
1	MW	Intro, Earth
2	MW	Terrestrial planets, dwarf planets, asteroids, comets
3	MW	Jovian planets, formation of the solar system
4	MW	The night sky (no Friday lecture)
5	MW	Cycles of the Moon, history of astronomy, gravity
6	JD	The Sun, light and atoms, telescopes
7	JD	Stars
8	JD	Stellar evolution, when stars die, neutron stars and black holes
9	JD	The Milky Way, interstellar medium
10	JD	Formation of the Milky Way, life in the Universe
11	RM	Other galaxies, large scale structure of the Universe cosmology
12	RM	Distant galaxy observations, Cosmology
13	MW/JD/RM	Revision

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be

imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcome

- Be able to discuss the implications of funding scientific research.

Assessment task

- Essay

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcome

- Be able to discuss the implications of funding scientific research.

Assessment task

- Essay

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcome

- Be able to discuss the implications of funding scientific research.

Assessment task

- Essay

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where

relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Knowledge of the layout and contents of the solar system.
- Knowledge of the structure and lifecycle of stars, including our Sun.
- Knowledge of how galaxies form, their basic structure and how they relate to the cosmology of the universe.
- Demonstrate understanding of practical and conceptual topics in observational astronomy.
- Be able to conduct, analyse, and draw conclusions from hands-on experimental work.

Assessment tasks

- Assignments
- Labs
- Final exam

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Knowledge of the layout and contents of the solar system.
- Knowledge of the structure and lifecycle of stars, including our Sun.
- Knowledge of how galaxies form, their basic structure and how they relate to the cosmology of the universe.
- Demonstrate understanding of practical and conceptual topics in observational astronomy.
- Be able to conduct, analyse, and draw conclusions from hands-on experimental work.

Assessment tasks

- Assignments

- Labs
- Final exam

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Knowledge of the layout and contents of the solar system.
- Knowledge of the structure and lifecycle of stars, including our Sun.
- Knowledge of how galaxies form, their basic structure and how they relate to the cosmology of the universe.
- Demonstrate understanding of practical and conceptual topics in observational astronomy.
- Be able to conduct, analyse, and draw conclusions from hands-on experimental work.

Assessment tasks

- Assignments
- Labs
- Final exam

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Be able to conduct, analyse, and draw conclusions from hands-on experimental work.
- Be able to discuss the implications of funding scientific research.

Assessment tasks

- Assignments
- Essay

- Labs

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcome

- Be able to discuss the implications of funding scientific research.

Assessment task

- Essay

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcome

- Be able to discuss the implications of funding scientific research.

Assessment task

- Essay