ASTR170

Introductory Astronomy: Our Place in the Universe

S1 Day 2015

Dept of Physics and Astronomy

Contents

General Information

Unit convenor and teaching staff
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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:

Introductory hands-on experimental work.

Practical and conceptual topics in observational astronomy.

Introduction to the solar system, including the planets.

The structure and lifecycle of stars, including our Sun.

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

Explore the implications of funding scientific research.

Assessment Tasks

Name	Weighting	Due
Assignments	20%	See below
Essay	10%	Week 8
Labs	30%	See below
Final exam	40%	University Examination Period

Assignments

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

There will be five (5) assignments due that will cover concepts covered in the lectures. One of the assignments will require observing the sky at night. These will be submitted via iLearn.

On successful completion you will be able to:

- Introductory hands-on experimental work.
- Practical and conceptual topics in observational astronomy.
- Introduction to the solar system, including the planets.
- The structure and lifecycle of stars, including our Sun.
- How galaxies form, their basic structure and how they relate to the cosmology of the universe.

Essay

Due: **Week 8**

Weighting: **10%**

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:

- Explore the implications of funding scientific research.

Labs

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

Each student must attend six (6) practical sessions and complete six (6) laboratory exercises.

On successful completion you will be able to:

- Introductory hands-on experimental work.
- Practical and conceptual topics in observational astronomy.

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:

- Practical and conceptual topics in observational astronomy.
- Introduction to the solar system, including the planets.
- The structure and lifecycle of stars, including our Sun.
- How galaxies form, their basic structure and how they relate to the cosmology of the universe.

Delivery and Resources

Lectures

Mondays 12-2pm E7B Mason Theatre Tuesdays 9-10am X5B T1 Theatre

Lectures are automatically recorded and are available on iLearn.

Slides from the lectures will be available on iLearn as well.

Assignments

Assignments need to be submitted on iLearn.

Due dates for assignments are:

- Assignment 1 - Friday 13 March 5pm
- Assignment 2 - Thursday 2 April 5pm
- Assignment 3 - Friday 8 May 5pm
- Assignment 4 - Friday 29 May 5pm
- Assignment 5 (observatory) - Friday 5 June 5pm

Essay

1000-1500 word essay to be submitted electronically via iLearn. Must be typed.

Labs

Lab attendance is required. The lab is located in E7B 209-13.

Each student is required to sign up for one of the lab sessions:

- Monday 2-4pm
- Tuesday 11-1pm
- Tuesday 2-4pm
- Thursday 10-12pm
- Thursday 12-2pm

Week 2 we will have a special planetarium lab.

Normal labs will start on week 4.

There is a mandatory lab notebook that will be available from the bookstore in week 3. The lab assessment is based on in-lab work only.

Textbook

The lectures are based upon the following textbook, which is not 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 versions of the textbook are OK.

Unit Schedule

Week	Lecturer	Topic

1	LS	Intro, Earth
2	LS	Terrestrial planets, dwarf planets, asteroids, comets
3	LS	Jovian planets, formation of the solar system
4	MW	The Milky Way, gravity
5	MW	The Milky Way, Interstellar medium
6	MW	Other galaxies, large scale structure of the Universe
7	MW	Distant galaxy observations, light and atoms, telescopes
8	LS	The night sky, cycles of the Moon, the Sun
9	LS	Other stars, formation of stars and stellar structure
10	LS	Stellar evolution, when stars die, neutron stars and black holes
11	MW	History of astronomy, cosmology
12	MW	Cosmology, life in the Universe
13	LS/MW	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

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

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

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.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://informatics.mq.edu.au/help/.

When using the University's IT, you must adhere to the Acceptable Use 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

- Explore 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

- Explore 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

- Explore 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

- Introductory hands-on experimental work.
- Practical and conceptual topics in observational astronomy.

- Introduction to the solar system, including the planets.
- The structure and lifecycle of stars, including our Sun.
- How galaxies form, their basic structure and how they relate to the cosmology of the universe.

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

- Introductory hands-on experimental work.
- Practical and conceptual topics in observational astronomy.
- Introduction to the solar system, including the planets.
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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

- Introductory hands-on experimental work.
- Practical and conceptual topics in observational astronomy.
- Introduction to the solar system, including the planets.
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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

- Introductory hands-on experimental work.
- Explore 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

- Explore 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

- Explore the implications of funding scientific research.

Assessment task

- Essay

Changes since First Published

Date	Description
10/03/2015	Added lecture schedule.