ASTR170

Introductory Astronomy: Our Place in the Universe

S1 Day 2018

Dept of Physics and Astronomy

Contents

General Information

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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:

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

Knowledge of the layout and contents of our Solar System.

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 infrastructure and research.

Demonstrate foundational learning skills including active engagement in their learning process.

General Assessment Information

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 https://students.mq.edu.au/study/my-study-program/special-consideration/disruption-to-stud

ies

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1 - Short Questions	5%	No	6/04/18
Assignment 2 - Short Video	10%	No	11/05/18
Assignment 3 - Quiz	5%	No	01/06/18
Assignment 4 - Observatory	10%	No	08/06/18
Labs	30%	Yes	See below
Exam	40%	Yes	University Examination Period

Assignment 1 - Short Questions

Due: **6/04/18**
Weighting: **5%**

This assignment will consist of short-answer questions. Assignments must be submitted on iLearn. The due date is 5pm Friday 6th April 2018.

On successful completion you will be able to:

- Knowledge of the structure and lifecycle of stars, including our Sun.
- Demonstrate understanding of practical and conceptual topics in observational astronomy.

Assignment 2 - Short Video

Due: **11/05/18**
Weighting: **10%**

This assignment requires a 2-3 minute video addressing the question below. It is to be submitted electronically via iLearn. The due date is 5pm 11th May 2018.

Topic for the short video is:

Australia has invested heavily in astronomy infrastructure over the last decade. Examples include the Square Kilometer Array (SKA), the Anglo-Australian Telescope (AAT), and the recent Strategic Partnership to the European Southern Observatory (ESO). With reference to at least one major astronomical facility or major investment, present arguments for and/or against this use of taxpayer money.

This topic is intended to give you an understanding of the ethics, social responsibility and perceived value of pure astronomical research in today's world.

Guidelines to make the video:

The video should not be more than 3 minutes. Minimum time is 1 minute.

The video must be made individually.

It is required that students present themselves in the video at least during their introduction.

The following marking rubric will be used for assessment:

1. Correct and relevant information is given about at least one major Australian investment in astronomy (weighting = 3%)

2. The arguments supporting your position are clear and logically constructed (weighting = 3%)

3. The discussion is appropriately linked to the choice of astronomical project (weighting = 3%)

4. Creativity (weighting = 1%)

On successful completion you will be able to:

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

Assignment 3 - Quiz

Due: **01/06/18**
Weighting: **5%**

This assignment will be an online quiz. The assignments must be submitted on iLearn. The due date is 5pm Friday 1st of June 2018.

On successful completion you will be able to:

- Knowledge of the layout and contents of our Solar System.
- 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.

Assignment 4 - Observatory

Due: **08/06/18**
Weighting: **10%**

This assignment will require observing the sky at night. Assignments must be submitted on iLearn. The due date is 5pm Friday 8th June 2018.

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.

Labs

Due: **See below**
Weighting: **30%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Each student must attend five (5) practical sessions and complete five (5) laboratory exercises starting in **Week 5**. The lab assessment is based on in-lab work only. The lab schedule is presented below (see 'Delivery and Resources').

Attendance at labs is a hurdle requirement. You must attend at least 5 lab sessions to have the potential to pass the unit.

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.
- Demonstrate foundational learning skills including active engagement in their learning process.

Exam

Due: **University Examination Period**
Weighting: **40%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

A two-hour final exam consisting of multiple-choice and short-answer questions will take place in the university exam period. No material will be allowed in the exam room.

The final examination is a hurdle requirement. You must obtain a mark of at least 40% to have the potential to pass the unit. If your mark in the final examination is between 30% and 39% inclusive then you will be given a second and final chance to attain the required level of performance. Hurdle exams will be offered in the supplementary exam period.

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. You can check the supplementary exam information

page on FSE101 in iLearn (bit.ly/FSESupp) for dates, and approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

On successful completion you will be able to:

- Knowledge of the structure and lifecycle of stars, including our Sun.
- Knowledge of the layout and contents of our Solar System.
- 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

Lectures:

- Thursday 1-2pm - 23 Wallys Wlk - P.G.Price Theatre
- Friday 10-11am - 14 Sir Christopher Ondaatje Ave - Mason Theatre
- and 12-1pm - 23 Wallys Wlk - P.G.Price Theatre

Lectures are automatically recorded and will be available on iLearn, along with the lecture slides. Lectures will also be live streamed. The following link provides all information on lecture recordings and live streaming.

https://students.mq.edu.au/support/study/tools-and-resources/ilearn/ilearn-quick-guides-for-students/lecture-recordings

Labs:

The labs will be held in E7B (14 Sir Christopher Ondaatje Avenue) rooms 213 and 209 (enter through 213). Students are required to do 5 labs, but have the option of doing a 6th (which they can do in the extra week). The lab schedule is as follows:

	Week 5	Week 6	Week 7		Week 8	Week 9	Week 10	Week 11	Week 12
Monday (12pm-2pm and 2pm-4pm)	Lab 1	Public Holiday	Lab 2	Mid Semester Break	Lab 3	Lab 4	Lab 5	Extra Week	
Tuesday (10am-12pm)	Lab 1	Lab 2	Lab 3		Lab 4	Lab 5	Extra Week		

Wednesday (10am-12pm)	Lab 1	Lab 2	Lab 3		Lab 4	Lab 5	Extra Week		
Thursday (11am-1pm)	Lab 1	Lab 2	No Labs		Lab 3	Lab 4	Lab 5	Extra Week	
Friday (2pm-4pm)	Public Holiday	Lab 1	No Labs		Lab 2	Lab 3	Lab 4	Lab 5	Extra Week

A mandatory lab notebook will be available from the bookstore after 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.)

In Week 2 we will hold special planetarium sessions during the labs.

Textbook:

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

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

Earlier editions of the textbook are acceptable.

Unit Schedule

Week	Lecturer	Topic	Textbook Chapters
1	J. Dawson	Introduction, the night sky and celestial motions, moon phases & eclipses	1, 2, 3
2	J. Dawson	Origins of modern astronomy, gravity, light & atoms (1)	4, 5, 7
3	J. Dawson	Light & atoms (2), telescopes, the Sun	7, 6, 8
4	J. Dawson	Introduction to the stars, the interstellar medium	9, 10
5	J. Dawson	Star formation (only 1 lecture this week due to Good Friday)	11
6	J. Dawson	Stellar structure and evolution, stellar death	12, 13
7	J. Dawson / D. Kamath	Neutron stars & black holes, life in the Universe	14
8	D. Kamath	The Milky Way Galaxy, other galaxies	15, 16

Week	Lecturer	Topic	Textbook Chapters
9	D. Kamath	Active galaxies & supermassive black holes	17
10	D. Kamath	Modern cosmology	18
11	C. Purcell	Origin of the solar system and extrasolar planets	19
12	C. Purcell	Earth and other planets	20, 21, 22, 23, 24, 25
13	All	Revision Week	

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- Special Consideration Policy *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

Undergraduate students seeking more policy resources can visit the Student Policy Gateway (https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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/study/getting-started/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

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

- Demonstrate foundational learning skills including active engagement in their learning

process.

Assessment task

- Labs

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 structure and lifecycle of stars, including our Sun.
- Knowledge of the layout and contents of our Solar System.
- 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.

Assessment tasks

- Assignment 1 - Short Questions
- Assignment 3 - Quiz
- Assignment 4 - Observatory
- Labs
- 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 structure and lifecycle of stars, including our Sun.

- Knowledge of the layout and contents of our Solar System.
- 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.
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Assessment tasks

- Assignment 1 - Short Questions
- Assignment 3 - Quiz
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- Labs
- 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

- 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

- Assignment 1 - Short Questions
- Assignment 3 - Quiz
- Assignment 4 - Observatory
- Labs
- 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 outcome

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

Assessment task

- Assignment 2 - Short Video

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 infrastructure and research.

Assessment task

- Assignment 2 - Short Video

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 infrastructure and research.

Assessment task

- Assignment 2 - Short Video

Changes since First Published

Date	Description
20/02/2018	Typographical errors corrected