UNSW Course Outline

PHYS1116 Astrophysics - 2024

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General Course Information

Course Code : PHYS1116
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Science
Academic Unit : School of Physics
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

This course provides an introduction to astrophysics aimed at students who are taking a Science or Advanced Science degree and majoring in Physics or a physical science, or who want a more challenging, higher level introduction to the subject. The topics covered in this course are the same as PHYS1160, but with an increased quantitative perspective. An additional focus will be

provided on the details of the facilities and techniques used in modern astrophysics research. PHYS1116 Astrophysics features more advanced assessment, including a separate problem-solving class.

Topics to be covered include: astronomical techniques, the history of astronomy across cultures, the Big Bang and beginnings of the universe, formation and evolution of galaxies, the origin of life on Earth and search for life elsewhere, stellar structure and evolution, planet formation, black holes, and compact objects.

This course is intended primarily as a technical subject and a pathway into the higher year astrophysics subjects. It has Physics 1A (PHYS1121) as assumed prior knowledge. Students without a background in physics should consider instead PHYS1160 Introduction to Astronomy, which is a standalone course with a broader, more qualitative focus.

Course Aims

This course provides an introduction to astrophysics and the techniques of data analysis and scientific communication. This course is aimed at students who are taking a science or advanced science degree and majoring in physics or a physical science, or who want a more challenging, higher-level introduction to the subject.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Analyse astronomical data from modern telescope surveys of stars and galaxies using techniques frequently used by professional astronomers
CLO2 : Solve astronomy-related problems using quantitative methods
CLO3 : Apply knowledge of key concepts in astronomy and astrobiology, including the formation of stars, planets, and galaxies; the history of life on Earth; and the beginning and ultimate fate of the Universe
CLO4 : Justify how, using simple experimental techniques, astrophysical phenomena can be observed and used to demonstrate our understanding of the Universe
CLO5 : Communicate concepts in astronomy accurately in written and verbal forms and at an appropriate level for technical audiences

Course Learning Outcomes	Assessment Item
CLO1 : Analyse astronomical data from modern telescope surveys of stars and galaxies using techniques frequently used by professional astronomers	• Experiments
CLO2 : Solve astronomy-related problems using quantitative methods	• Weekly Quizzes • Experiments
CLO3 : Apply knowledge of key concepts in astronomy and astrobiology, including the formation of stars, planets, and galaxies; the history of life on Earth; and the beginning and ultimate fate of the Universe	• 'Astronomy Picture of the Day' (APOD) Assignment • Short Report • Weekly Quizzes
CLO4 : Justify how, using simple experimental techniques, astrophysical phenomena can be observed and used to demonstrate our understanding of the Universe	• Experiments
CLO5 : Communicate concepts in astronomy accurately in written and verbal forms and at an appropriate level for technical audiences	• 'Astronomy Picture of the Day' (APOD) Assignment • Short Report

Learning and Teaching Technologies

Moodle - Learning Management System

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
'Astronomy Picture of the Day' (APOD) Assignment Assessment Format: Individual	30%	
Experiments Assessment Format: Individual	30%	
Weekly Quizzes Assessment Format: Individual	10%	
Short Report Assessment Format: Individual	30%	

Assessment Details

'Astronomy Picture of the Day' (APOD) Assignment

Assessment Overview

You will be expected to complete a written assignment in a format of your choice . This assignment tests your research and communication skills. Early in the term, you will select one of several randomly allocated images to focus on for your assignment. In week 5, you will submit an assessment plan (worth 5% of your course mark) and receive feedback on this plan within 2 weeks of submission via a marked rubric. In week 9, you will make your final submission (worth 25%). You will receive feedback in the form of written comments and a marked rubric.

Course Learning Outcomes

- CLO3 : Apply knowledge of key concepts in astronomy and astrobiology, including the formation of stars, planets, and galaxies; the history of life on Earth; and the beginning and ultimate fate of the Universe
- CLO5 : Communicate concepts in astronomy accurately in written and verbal forms and at an appropriate level for technical audiences

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Generative AI Permission Level

Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the tool, software or service

should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.
If your Convenor has concerns that your answer contains passages of AI-generated text or media that have not been sufficiently modified you may be asked to explain your work, but we recognise that you are permitted to use AI generated text and media as a starting point and some traces may remain. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.
For more information on Generative AI and permitted use please see here.

Experiments

Assessment Overview

You will be expected to complete two experiments of your choice (worth 15% each) that test your data analysis and communication skills. These experiments use astronomical observations and web-based simulations. To report your results for each experiment, you will submit one 5-minute (maximum length) video (2 videos in total) at two separate times towards the end of term. You will receive feedback on each video within 2 weeks of submission.

Course Learning Outcomes

- CLO1 : Analyse astronomical data from modern telescope surveys of stars and galaxies using techniques frequently used by professional astronomers
- CLO2 : Solve astronomy-related problems using quantitative methods
- CLO4 : Justify how, using simple experimental techniques, astrophysical phenomena can be observed and used to demonstrate our understanding of the Universe

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Weekly Quizzes

Assessment Overview

You will be expected to complete 8 weekly quizzes in weeks 2-10 (except week 6) that test your knowledge of concepts covered in the course from the previous week. There are 6 quantitative questions in each quiz (in some weeks, there is an additional qualitative problem). You have 30 minutes to complete each quiz once you have started, and your first attempt counts towards your grades. Quizzes are available from the start of term, and you must have completed your attempt by the end of the week that it is due. Once you complete the quiz, you will receive immediate feedback.

Course Learning Outcomes

- CLO2 : Solve astronomy-related problems using quantitative methods
- CLO3 : Apply knowledge of key concepts in astronomy and astrobiology, including the formation of stars, planets, and galaxies; the history of life on Earth; and the beginning and ultimate fate of the Universe

Assignment submission Turnitin type

This is not a Turnitin assignment

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
For more information on Generative AI and permitted use please see here.

Short Report

Assessment Overview

You will be expected to complete one short report, which may include researching and answering a specified problem or summarising an assigned article. The short report improves your research and communication skills. The report is due towards the end of term. You will receive feedback on your report within 2 weeks of submission.

Course Learning Outcomes

- CLO3 : Apply knowledge of key concepts in astronomy and astrobiology, including the formation of stars, planets, and galaxies; the history of life on Earth; and the beginning and ultimate fate of the Universe
- CLO5 : Communicate concepts in astronomy accurately in written and verbal forms and at an appropriate level for technical audiences

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General Assessment Information

The standard late submission penalties apply to all assessment except tests and exams.

Grading Basis

Standard

Requirements to pass course

Students must achieve at least 50 overall to pass the course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 9 September - 15 September	Topic	What is historical astronomy? What is modern astronomy? Lecture 1: What is astronomy?
Week 2 : 16 September - 22 September	Topic	How did the Universe begin? Lecture 2: What physics is important to astronomy? Lecture 3: What is cosmology?
	Assessment	Quiz 1
Week 3 : 23 September - 29 September	Topic	What are galaxies? Lecture 4: What are galaxies? Lecture 5: The Milky Way Galaxy
	Assessment	Quiz 2
Week 4 : 30 September - 6 October	Topic	What are stars? Lecture 6: What are stars?
	Assessment	Quiz 3
Week 5 : 7 October - 13 October	Topic	What is the Solar system? Lecture 7: What is so special about the Sun? Lecture 8: What is the Solar system?
	Assessment	Quiz 4 APOD Draft
Week 6 : 14 October - 20 October	Topic	Additional Lecture: Astronomy as a professional practice
Week 7 : 21 October - 27 October	Topic	Is there life in the Solar system? Lecture 9: What is the Earth? Lecture 10: What is life? Lecture 11: Is there life in the Solar system?
	Assessment	Quiz 5 Short Report
Week 8 : 28 October - 3 November	Topic	What is beyond the Solar system? Lecture 12: What is beyond the Solar system?
	Assessment	Quiz 6 Experiment 1
Week 9 : 4 November - 10 November	Topic	Is there life in the Universe? Lecture 13: How do we find life on other worlds? Lecture 14: How else can we find life?
	Assessment	Quiz 7 APOD Final
Week 10 : 11 November - 17 November	Topic	How does everything end? Lecture 15: What are supernovae and stellar remnants? Lecture 16: What are gravitational waves? Lecture 17: How will the universe end?
	Assessment	Quiz 8 Experiment 2

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Michael Ashley					Yes	Yes

Other Useful Information

Academic Information

Upon your enrolment at UNSW, you share responsibility with us for maintaining a safe, harmonious and tolerant University environment.

You are required to:

- Comply with the University's conditions of enrolment.
- Act responsibly, ethically, safely and with integrity.
- Observe standards of equity and respect in dealing with every member of the UNSW community.
- Engage in lawful behaviour.
- Use and care for University resources in a responsible and appropriate manner.
- Maintain the University's reputation and good standing.

For more information, visit the UNSW Student Code of Conduct Website.

Academic Honesty and Plagarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.
Further information about referencing styles can be located at https://student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.
Further information about academic integrity, plagiarism and the use of AI in assessments can be located at:

- The Current Students site,
- The ELISE training site, and
- The Use of AI for assessments site.

The Student Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct

Submission of Assessment Tasks

Penalty for Late Submissions

UNSW has a standard late submission penalty of:

- 5% per day,
- for all assessments where a penalty applies,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Any variations to the above will be explicitly stated in the Course Outline for a given course or assessment task.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

Special Consideration

If circumstances prevent you from attending/completing an assessment task, you must officially apply for special consideration, usually within 3 days of the sitting date/due date. You can apply by logging onto myUNSW and following the link in the My Student Profile Tab. Medical documentation or other documentation explaining your absence must be submitted with your application. Once your application has been assessed, you will be contacted via your student email address to be advised of the official outcome and any actions that need to be taken from there. For more information about special consideration, please visit: https://student.unsw.edu.au/special-consideration

Important note: UNSW has a "fit to sit/submit" rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

Faculty-specific Information

Additional support for students

- The Current Students Gateway
- Student Support
- Academic Skills and Support
- Student Wellbeing, Health and Safety
- Equitable Learning Services
- UNSW IT Service Centre
- Science EDI Student Initiatives, Offerings and Guidelines