

# PHYS 2004 THE COSMOS IN PERSPECTIVE: INFORMATION AND LIFE

**Credit Points** 10

**Legacy Code** 300966

**Coordinator** Ain De Horta ([https://directory.westernsydney.edu.au/search/name/Ain De Horta/](https://directory.westernsydney.edu.au/search/name/Ain%20De%20Horta/))

**Description** From the Big Bang to the end of the Universe, from our own Solar System to the farthest superclusters of galaxies, our knowledge of the Universe is growing at an amazing rate. This unit will explore the cosmos at scales from planets to the edge of the visible universe. We develop an appreciation of the processes of science, and an understanding of how astrophysicists know what they know. We will consider cultural perspectives on the cosmos, including that of indigenous Australians. We will consider our place in the cosmos: the requirements for life to exist, and the possibility of other life in the Universe.

**School** Science

**Discipline** Astronomy

**Student Contribution Band** HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees ([https://www.westernsydney.edu.au/currentstudents/current\\_students/fees/](https://www.westernsydney.edu.au/currentstudents/current_students/fees/)) page.

**Level** Undergraduate Level 2 subject

## Learning Outcomes

On successful completion of this subject, students should be able to:

1. Describe and compare scientific and cultural views of the history and nature of the Universe, including indigenous Australian views;
2. Describe the necessary conditions for life and how species evolve and grow to complexity and uses of information theory to understand cosmic evolution;
3. Describe how life depends on energy from the stars;
4. Recognise the significance of solar system dynamics in providing the thermal requirements for life;
5. Discuss modern theories of star and planet formation and evolution, and recognise the types of stars in galaxies;
6. Theorise on the possibilities of other life forms;
7. Discuss the development of consciousness;
8. Postulate on how the universe will evolve, and what this means for the future of life in the universe.

## Subject Content

1. Creation and the Universe - scientific and cultural perspectives, including indigenous Australian perspectives,
2. The perspectives of Information and Life. The characteristics of life, how life first appeared on the earth and whether these conditions can be expected to occur on other planets with specific emphasis on computational simulations,
3. Biological evolution, mass extinctions and the limits of life (extremophiles) - computational predictions. The growth of complexity and structure in the universe, and uses of information theory to understand cosmic evolution,

4. The formation of stars and planets and the habitable zones around stars,
5. Different kinds of stars and the light they emit,
6. Whether consciousness arises from elementary interactions between atoms and molecules,
7. Whether computers and robots can be said to be conscious,
8. The final state of the Universe and the implications for any life present,
9. Astrology vs astronomy and The future of life on Earth,
10. Life in space - space travel, Fermi paradox, Schuman effect, Overview effect, SETI, terraforming and UFO.

## Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Item	Length	Percent	Threshold	Individual/Group Task
Quiz	10 minutes (per Quiz)	10	N	Individual
Presentation	6 minutes	20	N	Individual
Report	1,300 to 1,500 words	25	N	Individual
Intra-session Exam	60 minutes	45	Y	Individual

Prescribed Texts

- Bennett, J., Donahue, M. O., Schneider, N., & Voit, M. (Eds.). (2014). *The cosmic perspective* (7th ed.). Boston: Addison-Wesley.

Teaching Periods

## Autumn

### Parramatta - Victoria Rd

#### Day

**Subject Contact** Ain De Horta ([https://directory.westernsydney.edu.au/search/name/Ain De Horta/](https://directory.westernsydney.edu.au/search/name/Ain%20De%20Horta/))

View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=PHYS2004\\_22-AUT\\_PS\\_D#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=PHYS2004_22-AUT_PS_D#subjects))