

# ANU Astrophysics Course: Syllabus

## The Four Courses

We are offering four courses (ANU-ASTRO1x, ANU-ASTRO2x, ANU-ASTRO3x, ANU-ASTRO4x) which together make up the ANU's first year astrophysics course.

These courses can be taken in any order. ANU-ASTRO1x introduces some topics used in the other courses, so if you don't do it first, you may need to do a little background reading.

Here is the combined syllabus for these four courses.

## ANU-ASTRO1x Greatest Unsolved Mysteries of the Universe

- Section 1: The Expanding Universe
- Section 2: The Big Bang
- Section 3: Dark Energy
- Section 4: Giant Black Holes
- Section 5: First Light in the Universe
- Section 6: Gamma-Ray Bursts
- Section 7: Dark Matter
- Section 8: Solar System Formation
- Section 9: Life in Space

## ANU-ASTRO2x Exoplanets

- Section 1: Pulsar planets
- Section 2: Finding Planets using Reflex Motion
- Section 3: More radial velocity planets and transits
- Section 4: Recent transit results
- Section 5: Gravitational Microlensing
- Section 6: Debris Disks
- Section 7: Adaptive Optics
- Section 8: Direct Imaging
- Section 9: Earth-like planets

## ANU-ASTRO3x The Violent Universe

- Section 1: White dwarf stars
- Section 2: Degenerate stars and Quantum Mechanics
- Section 3: Dwarf Novae
- Section 4: Classical Novae, the Chandrasekhar Limit and Nuclear Physics
- Section 5: Thermonuclear Supernovae
- Section 6: Core Collapse Supernovae
- Section 7: X-ray astronomy and Neutron stars
- Section 8: Special Relativity
- Section 9: Black Holes

# **ANU-ASTRO4x Cosmology**

Section 1: Newtonian cosmology

Section 2: General Relativity

Section 3: Friedman geometry and Dark Energy

Section 4: Dark Matter

Section 5: Dark Matter

Section 6: The Cosmic Microwave Background

Section 7: The very early universe

Section 8: The fate of the universe

Section 9: Crazy ideas, multiverses, entropy of the universe etc.