

Liverpool John Moores University

Title: ASTRONOMY TEACHING
Status: Definitive
Code: **4007ASTRON** (101068)
Version Start Date: 01-08-2011

Owning School/Faculty: Astrophysics Research Institute
Teaching School/Faculty: Astrophysics Research Institute

Team	Leader
Andrew Newsam	Y
Philip James	
David Hyder	

Academic Level: FHEQ4 **Credit Value:** 12.00 **Total Delivered Hours:** 100.00
Total Learning Hours: 120 **Private Study:** 20

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Online	50.000
Practical	10.000
Seminar	10.000
Tutorial	10.000
Workshop	20.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Test	AS1	70 multiple choice questions, open-book test over web	25.0	
Reflection	AS2	Reflective commentary on A level syllabus for astronomy and materials available	40.0	
Report	AS3	Report on lesson using National Schools' Observatory or one of the provided 'practicals'	35.0	

Aims

To provide A level science teachers with a sufficient depth of knowledge of astronomy to comfortably teach it.

Learning Outcomes

After completing the module the student should be able to:

- 1 Describe in broad terms the way our knowledge of the contents of the Universe has developed from pre-history to the present day, and how this development has influenced and benefited from the advance of science and technology in general.
- 2 Be confident with astronomical computing and the use of internet browser.
- 3 Demonstrate a reflective understanding of the A level astronomy syllabus.
- 4 Discuss the major questions that are currently being addressed in astronomy.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

test	1	2		
reflection	1	3	4	
report	1	2	3	4

Outline Syllabus

(1) Introduction to Astronomy - a sense of scale, Astronomy and astrology; value of astronomy in science.

(2) Ancient Astronomy - Earth-centred Universe to a Sun-centred Universe; Greek development of the scientific method; Greek cosmological theory; Star of Bethlehem; early civilisations' view of the Universe

(3) The birth of modern astronomy - Copernicus and the subsequent revolution in thought; Copernicus, Galileo, Kepler, Newton and Einstein; the astronomical and technological revolution

(4) The Earth in space; seasons, tides, phases of the Moon; eclipses; monitoring and communications satellites; finding your way around the night sky

(5) Modern Observatories - Underground, ground and space-based ... professional multi-wavelength astronomy; the electromagnetic spectrum; the Liverpool robotic telescope and the World-Wide Web

(6) The Sun; solar flares; sunspots; solar granulation; internal structure; composition; solar corona and wind; solar energy; solar neutrino problem.

(7) The Solar system; inner 'rocky' planets; asteroids; outer gaseous planets; comets; planetary exploration; planetary mining.

(8) The Solar system: outer gaseous planets; comets; formation and evolution

(9) Cycles of creation; formation of stars and planets; variable stars; galactic structures; interstellar medium; stellar energy sources; evolution of stars; dying stars.

(10) Stellar remnants: brown dwarfs, white dwarfs, neutron stars & pulsars, black

holes, supernovae; dark matter candidates

(11) *The Milky Way: different components; chemical evolution; importance of dust; interstellar medium; spiral structure; distance indicators; galactic dark matter*

(12) *In-depth examination of specialist topic, including recent video material from distinguished scientist.*

(13) *Cosmology; why is the sky dark at night; the big bang and other cosmologies; thermal background radiation; the beginning of the Universe; formation of heavy elements.*

(14) *Galaxy formation & evolution; galaxy classification; dynamics of galaxies; gravitational lensing; black holes; inflation; quasars; age of the Universe; missing mass; the fate of the Universe.*

(15) *Search for extraterrestrial intelligence; how life might evolve on other worlds; prospects for interstellar travel; terraforming.*

Learning Activities

CD-ROM, videos, www, email, classroom activities, conversations with tutors, discussion with other teachers on the newsgroup, exchange of lesson plans with other A level astronomy teachers

References

Course Material	Book
Author	Kaufman W.J.III, Freedman R.A.
Publishing Year	2000
Title	Universe
Subtitle	
Edition	3rd
Publisher	W.H.Freeman and company
ISBN	0-7167-3495-8

Course Material	Book
Author	BBC
Publishing Year	2001
Title	Space
Subtitle	
Edition	
Publisher	www.bbc.co.uk/space
ISBN	

Course Material	Book
Author	Magazines
Publishing Year	2001
Title	Astronomy Now, Sky & Telescope, New Scientist, Scientific American

Subtitle	
Edition	
Publisher	
ISBN	

Course Material	Book
Author	www.astro.livjm.ac.uk
Publishing Year	2001
Title	Astrophysics Research Institute web site
Subtitle	
Edition	
Publisher	
ISBN	

Course Material	Book
Author	Ridpath I., Tirion W.
Publishing Year	2001
Title	Collins guide to stars and planets
Subtitle	
Edition	
Publisher	Collins
ISBN	0-00-219067-2

Notes

This module will be delivered by distance learning and will initially be trialled with local teachers.

Eventually it is intended to integrate the content and delivery of this module to be part of the National Schools Observatory (www.schoolsobservatory.org.uk).