Liverpool John Moores University

Title:	GALAXIES
Status:	Definitive
Code:	**4006ASTRON** (101067)
Version Start Date:	01-08-2011

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

Team	emplid	Leader
Philip James		Y
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Academic Level:	FHEQ4	**Credit Value:**	12.00	**Total Delivered Hours:**	100.00
Total Learning Hours:	120	**Private Study:**	20		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Online	8.000
Practical	80.000
Seminar	6.000
Tutorial	6.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Practice	AS1	Computer and practical exercises	70.0	
Essay	AS2	Popular Essay	30.0	

Aims

This module is a standalone distance learning course suitable for students from any background. As such it requires no specialist mathematical or scientific skills, but students would benefit from having first taken ASTAS1037, Exploring the Universe.

This is a multimedia course using interactive CD-ROM and video material, and looks at our current understanding of the contents, structure, formation and evolution of all types of galaxies, from dwarfs to giant spirals and ellipticals. Emphasis is placed on the types of observational techniques used in determining the properties in modern astronomy.

Learning Outcomes

After completing the module the student should be able to:

1   Describe in broad terms the structure, contents and formation processes of the main types of galaxies.
2   Have an appreciation of the types of techniques used by modern astronomers to investigate extragalactic objects, and in particularthe complementary information available from the different regions of the electromagnetic spectrum
3   Describe the importance of galaxies in defining our knowledge of the scale, age and evolution of the Universe.

Learning Outcomes of Assessments

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

prac exercises   1   2   3

essay   1   2   3

Outline Syllabus

1. Galaxy classification- ellipticals, spirals, dwarfs, irregulars and peculiars; the distribution of starlight in these different types.

2. Contents of galaxies, and how make-up varies with type, including stellar type and age; molecular, atomic and X-ray emitting gas; dust; magnetic fields; dark matter; and black holes.

3. The multi-wavelength appearance of different types of galaxies, including radio-emitting elliptical galaxies and star-forming spiralgalaxies as specific examples.

4. The structure and size of our Milky Way galaxy, and how these have been determined. The stellar populations of the Galactic disk, bulgeand halo.

5. Dynamics of spiral galaxies- measurement of disk rotation; determination of galaxy distances from rotation rate, and resulting determination of the Hubble constant; evidence for dark matter halos in disk galaxies and what these could be made from.

6. Star formation in spiral galaxies- how star formation can be detected and measured; triggers of star formation including spiral arms, tidal interactions, bars and self-propagating star formation. Spiral arms and the spiral winding problem.

7. Galaxy formation- what young galaxies look like, and how different wavelength regimes have been used to search for them, both in the early Universe and locally. Evidence for evolution of galaxies from the times probed by the Hubble Space Telescope to the present day.

8. The link between galaxy shapes and the local environments in which they live- cluster, group and field galaxy populations. The effects of environment on individual galaxies- interactions, mergers, removal of gas, infall of dwarf galaxies, and how these processes shape the galaxies we observe.

9. Dwarf galaxies- star-forming Magellanic irregulars and dwarf spheroidals. Relation to more luminous galaxies. Evidence for dark matter in dwarfs. The possible contribution of dwarfs to the total mass, luminosity and star-formation rate of the Universe.

10. Evidence for supermassive black holes in centres of galaxies. Possible links between these and quasar activity early in the history of the Universe, and the types of nuclear activity still observed in galaxies at the present epoch.

Learning Activities

CD-ROM notes, multiple choice questions and exercises, web resources and email interaction with tutors.

References

Course Material	Book
Author	Carroll and Ostlie
Publishing Year	1997
Title	An introduction to modern astrophysics
Subtitle	
Edition	
Publisher	Addison Wesley
ISBN	

Notes

This module will give students a detailed understanding of all aspects of this complex and rapidly evolving field.