

## MODULE DESCRIPTOR

<b>MODULE TITLE</b>	The Milky Way					
<b>MODULE CODE</b>	AA2051 (L5)	<b>JACS CODE</b>	F500	<b>CREDIT VALUE</b>	20 credits	
<b>DATE OF APPROVAL</b>	April 2017				<b>VERSION NUMBER</b>	1
<b>SCHOOL</b>	Physical Sciences and Computing			<b>PARTNER INSTITUTION</b>	N/A	

### RELATIONSHIP WITH OTHER MODULES

<b>Co-requisites</b>	NONE	<b>Pre-requisites</b>	AA1051	<b>Excluded Combinations</b>	None
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### MODULE AIMS

This module aims to

- Provide a broad introduction to the content, structure and evolution of the Milky Way, based on basic astronomy knowledge. Its approach is quantitative without taking a highly mathematical approach.
- Demonstrate how observations coupled to basic physical principles yield our current understanding of the Galaxy.
- Develop the student's ability to analyse scientific problems and enhance their ability to review and present scientific information in a logical and coherent way.
- Enhance the student's key skills (communication, numerical skills, IT, time-management).
- Provide practice in planning and producing a scientific essay.

### MODULE CONTENT

**1. The Milky Way: past, present and future.**

Context of evolution in the universe. Revising and reviewing relevant parts pre-requisite module, especially galaxies and parts of stellar lifecycle.

**2. The solar neighbourhood.**

Distances, star number densities, types of stars and structures; the Sun in an old SNR cavity; SNR gas; local disk structure; local motions and local moving group (giving age).

**3. Nebulae and Giant Molecular Clouds: stellar nurseries in the Galaxy.**

Gaseous nebulae; cold interstellar gas - optical discovery, star formation sites, hot interstellar gas, plasma, the X-ray Galaxy.

**4. Star clusters: open and globular.**

Case studies of young and older open clusters. Types of stars in open clusters.

Globular clusters; their positions and dynamics in the Galaxy. Population I and II (and III) stars.

**5. Interstellar dust.**

Discovery of interstellar obscuration. Absorption, scattering, reddening, colour excess and distance modulus. Composition, shape and sizes. Wavelength-dependence. Role in the life cycle of stars.

**6. The Radio Galaxy: spiral arms.**

Tools to probe the overall structure of the galactic disk. Spiral structure and spiral density waves.

Radio observation of molecules, complex organic molecules in the Galaxy.

**7. Dark Matter and the Halo**

Pop II, bulge and halo. Dynamical mass; velocity distribution. Evidence for dark matter in the Galaxy. Searches for it. What's in the halo? Candidates for dark matter.

**8. Journey to the Centre of the Galaxy**

Towards the Centre. The IR Galaxy and IR sources. Barred spiral. Supermassive black hole. The birth and death of the Galaxy.

## INTENDED LEARNING OUTCOMES

<b>On successful completion of this module a student will be able to:</b>	
1.	Describe the contents and discuss the complexities of the overall structure of the Milky Way.
2.	Explain the physical principles and processes involved in the Galaxy's evolution and relate them to its present-day structure
3.	Solve numerical problems in this subject area
4.	Plan, research and produce a structured scientific essay in this subject area.
5.	Analyse conceptual problems, make inferences and provide reasoned arguments to justify the conclusions drawn.

## ASSESSMENT METHODS

The method of assessment for this module has been designed to test all the learning outcomes. Students must demonstrate successful achievement of these learning outcomes to pass the module.

Number of Assessments	Form of Assessment	% weighting	Size of Assessment/Duration/ Wordcount	Category of assessment	Learning Outcomes being assessed
2	Question sheets (numerical and conceptual questions)	30%, 35%	5 questions	Coursework	1,2,3
1	Scientific essay	35%	1,500 words	Coursework	2,4,5

## MODULE PASS REQUIREMENTS

To pass this module you must achieve a mark of 40% or above, aggregated across all the assessments.

## APPENDIX

**MODULE CODE:** AA2051 (L5)

**MODULE TITLE:** The Milky Way

**LOCATION OF STUDY:** UCLAN CAMPUS

<b>MODULE TUTOR(S)</b>	Victor Debattista
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<b>MODULE DELIVERY</b>	Semester Long	Semester 1		Semester 2		Semester 3	
	Year long	Semester 1 & 2		✓	Semester 2 & 3		
	Other (please indicate pattern of delivery)	DISTANCE LEARNING					

### MODULE LEARNING PLAN

*All modules should include details of the average learning time based upon 200 hours per 20 credits.*

<b>LEARNING, TEACHING AND ASSESSMENT STRATEGY</b>	
<p>Distance learning students will learn via self-study, supported by detailed distance learning material supplied by the Course Team according to a Course Schedule. Tutorial support via online discussion forums, online classrooms email and telephone as required. Students will be encouraged to participate in on-line discussions.</p> <p>The learning materials include Course Notes with worked examples, and assessed coursework. Additional material and suggested further reading are available via Blackboard. The essay assignment is prefaced by guidance on researching and writing a scientific essay.</p> <p>The self-test questions encourage students to solve conceptual and numerical problems and to build their confidence prior to attempting the assessed question sheets.</p> <p>The assessed question sheets are designed to enable students to demonstrate their understanding and ability to solve problems and explain the concepts involved.</p> <p>The essay titles are chosen to be topical, reflecting recent galactic research. The essay is designed to enable students to develop their skills to plan, research and produce a structured scientific essay in this subject area.</p>	
<b>SCHEDULED LEARNING AND TEACHING ACTIVITY</b>	<b>No. of hours</b>
<b>Tutorial</b>	
<b>TOTAL SCHEDULED LEARNING HOURS</b>	<b>8</b>
<b>GUIDED INDEPENDENT STUDY</b>	
<p><i>First reading of posted materials (equiv. to lectures)</i></p> <p><i>Working through details</i></p> <p><i>Background reading</i></p> <p><i>Working on coursework assignments</i></p> <p><i>Reflection on feedback</i></p>	
<b>TOTAL GUIDED INDEPENDENT STUDY HOURS</b>	<b>192</b>
<b>TOTAL STUDENT LEARNING HOURS</b> <i>(eg 200 hours per 20 credits)</i>	<b>200</b>

## **BIBLIOGRAPHY AND LEARNING SUPPORT MATERIAL**

On-line Booklist: <http://readinglists.central-lancashire.ac.uk/search.html?q=AA2051>