UNIVERSITY OF CENTRAL LANCASHIRE

Programme Specification

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided.

Sources of information on the programme can be found in Section 17

1. Awarding Institution / Body	University of Central Lancashire
2. Teaching Institution and Location of Delivery	University of Central Lancashire, Preston Campus
3. University School/Centre	Physical Sciences and Computing
4. External Accreditation	RAS (endorsement) IOP (recognition)
5. Title of Final Award	BSc (Hons) Astronomy
6. Modes of Attendance offered	Distance Learning
7a) UCAS Code	n/a
7b) JACS Code	F500
8. Relevant Subject Benchmarking Group(s)	QAA: Subject Benchmark Statement for Physics, Astronomy and Astrophysics. Part A: Setting and Maintaining Academic Standards, February 2017. Part B: Assuring and Enhancing Academic Quality of the Quality Code, to be published. QAA: Subject Benchmark Statement for Physics, Astronomy and Astrophysics: Draft for Consultation, April 2016. QAA: Subject Benchmark Statement for Physics, Astronomy and Astrophysics, 2008.
9. Other external influences	National STEM Projects Institute of Physics
10. Date of production/revision of this form	April 2017

11. Aims of the Programme

- To provide an academically rigorous programme of Astronomy education suitable for astronomy enthusiasts with or without previous formal qualifications.
- To provide a quantitative understanding and knowledge of the physical and mathematical concepts underlying astrophysical processes
- To provide a broad balance of subject knowledge and skills
- To develop students' ability to think analytically and critically about scientific ideas in order to develop logical arguments and draw conclusions

- To provide the opportunity to develop skills and techniques used in astronomy which have wider applications (eg independent working, scientific problem solving, data analysis, preparation of scientific reports and use of (IT), communication of scientific ideas.)
- To enable students to apply the advanced tools of maths and physics to solve problems in astrophysics situations.
- To develop the students' investigative skills either through group activities or independent research using literature sources and/or subject databases
- To provide a suitable foundation for further study in Astronomy.

12. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

A1. describe and explain the structures of the universe and the processes that take place within it in terms of the underlying physical laws, including some at (or informed by) the forefront of astronomy.
A2. solve a broad range of advanced problems in astronomy using physical and rigorous mathematical techniques
A3. discuss and quantify uncertainties and limitations of astronomical theory
A4. discuss the techniques of observational astronomy and their limitations

Teaching and Learning Methods

Course Notes linked to recommended textbook with worked examples, self-test questions and solutions. Classroom tutorials and discussions via Elearn.
Feedback to students on assessed work, together with model answers to assessed questions.

Assessment methods

Continuous assessment via courseworks including:
Questions Sheets with both mathematical and conceptual problems, scientific essay, experimental report. Timed on-line open-book assignment. Dissertation.

B. Subject-specific skills

B1. design and implement astronomical observations
B2. use investigative techniques to retrieve astronomical information from on-line/library data sources
B3. analyse and process astronomical data taking into account the uncertainties
B4. plan and prepare a substantial scientific report on a topical astronomical subject.
B5. use a range of advanced and rigorous mathematical techniques and physical laws to solve problems

Teaching and Learning Methods

Observational exercises to carry out at a distance. Case studies using astronomical data, on-line discussions, tutorials
Self-test and assessed questions requiring use of mathematical techniques/spreadsheets/pocket calculator to solve quantitative problems.

Assessment methods

Researched scientific essays, Experimental reports. Dissertation.
Mathematical/numerical problems in assessed question sheets, timed on-line assignment

C. Thinking Skills

C1. review and analyse information in a critical way from a variety of sources (including scientific papers)
C2. Formulate problems in precise terms and think analytically and critically about scientific ideas in order to develop logical arguments and draw conclusions.
C3. synthesise different strands of a theory or problem to produce a solution
C4. plan and implement an investigation individually and within a group environment. Critically analyse the outputs and evaluate their significance.

Teaching and Learning Methods

Case studies, literature reviews, data analysis exercises, group activities, observations, library research and open-ended problems. Dissertation supervision.

Assessment methods

Scientific essays, experimental reports, group reports, question sheets with a balance of quantitative and open-ended questions, on-line assessment. Dissertation and viva.

D. Other skills relevant to employability and personal development

D1. use written communication skills effectively including a substantial dissertation
D2. use advanced numerical skills
D3. work independently to plan and manage own time to achieve specific objectives
D4. use scientific IT skills effectively to produce publication-style documents.
D5. work effectively as a team member towards common aims and objectives.

Teaching and Learning Methods

Effective communication via the written word and electronic media, such as discussion boards. Use of structured documents. Self-test questions. Manage personal study time to meet course deadlines. Group activities via Elearn.

Use IT to access course materials, analyse data, produce publication style reports, electronic presentations, etc.
Assessment methods
Researched scientific essays, Experimental reports Mathematical/numerical problems in assessed question sheets, timed on-line assignment.

13. Programme Structures				14. Awards and Credits
Level	**Module Code**	**Module Title**	**Credit rating**	
Level 6	AA3050 AA3051 AA3053 AA3056 AA3057	Astronomy Dissertation Origins Cosmology and Relativity Extreme States of Matter Collaborative Investigation.	20 20 20 20 20	**BSc (Hons) Astronomy** Requires 360 credits including a minimum of 220 at Level 5 or above and 100 at Level 6 or above **BSc Astronomy** Requires 320 credits including a minimum of 180 at Level 5 or above and 60 at Level 6 or above and must include AA1051 and AA1056.
Level 5	AA2051 AA2052 AA2053 AA2054 AA2055 AA2056	The Milky Way Galaxies beyond the Milky Way Ultraviolet, Optical and Infrared Astronomy Exploring the Solar System Solar Astrophysics Solar-Stellar Connection	20 20 20 20 20 20	**Exit Award: Diploma of Higher Education Astronomy** Requires 240 credits including a minimum of 100 at Level 5 or above and must include AA1051 and AA1056.
Level 4	AA1051 AA1053 AA1055 AA1056 AA1057 AA1058 AA1059 AA1066	Introduction to Astronomy Introduction to Cosmology IT for Astronomy Energy, Matter and the Universe Investigations in Astronomy Sun, Earth and Climate Introduction to Astrobiology Great Astronomers in History	20 20 20 20 20 20 20 20	**Exit Award: Certificate of Higher Education** Requires 120 credits at Level 4 or above and must include AA1051.
In addition a student may include one module (20 credits) of elective at level 4 and one module (20 credits) of elective at level 5.				

15. Personal Development Planning

It is particularly important that the PDP offered by our courses is optional and flexible. Currently the following opportunities for PDP exist:

• The admissions process includes interaction between Course Leader and applicant, advising on suitability of the course, given a student's aspirations for short or long-term study.

• The induction process, using Handbook and Elearn links, provides opportunities for students to use the University's Skills and PDP resources.

• The Distance Learning courses provide a structured environment for independent learning and time management, to pace study and meet coursework deadlines.

• Self-test exercises encourage students to assess their academic progress within a module.

16. Admissions criteria *

(including agreed tariffs for entry with advanced standing)

**Correct as at date of approval. For latest information, please consult the University's website.*

Programme Specifications include minimum entry requirements, including academic qualifications, together with appropriate experience and skills required for entry to study. These criteria may be expressed as a range rather than a specific grade.

Students will be informed of their personal minimum entry criteria in their offer letter.

Students who enter the programme within 2 years of completing full-time school education would normally be expected to have a new UCAS tariff of at least 128 points (eg ABB at A level) including:
• two A2 level passes (or equivalent) in any subjects
• and a pass in a science/technology subject at A2 level
• grade C passes in GCSE English and Mathematics.

Mature students and those without formal qualifications meeting the admissions criteria will be considered in the light of their ability to benefit and their commitment to degree level study. The latter may be demonstrated (for instance) by successful completion of the Certificate of Higher Education or other relevant courses at University level. Applicants with a CertHE would have advanced standing of 120 credits and would be Stage 1 complete on admission. A2 or A-level study of maths or science is advantageous but not compulsory.

17. Key sources of information about the programme

Student Handbook
Astronomy Module Catalogue
uclan website
www.StudyAstronomy.com

•

18. Curriculum Skills Map

				Programme Learning Outcomes																
Level	**Module Code**	**Module Title**	**Core (C), Compulsory (COMP) or Option (O)**	**Knowledge and understanding**				**Subject-specific Skills**					**Thinking Skills**				**Other skills relevant to employability and personal development**			
				A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3	D4	D5
LEVEL 6	AA3050	Astronomy Dissertation	**Comp**	√		√			√		√		√	√	√	√	√	√	√	√	
	AA3051	Origins	**Comp**	√		√			√		√		√	√	√		√		√	√	
	AA3053	Cosmology and Relativity	**Comp**	√	√	√					√	√	√	√	√		√	√	√		
	AA3056	Extreme States of Matter	**Comp**	√	√	√						√			√			√	√		
	AA3057	Collaborative Investigation	Comp	√		√			√		√		√	√	√	√	√		√	√	√
. LEVEL 5	AA2051	The Milky Way	O	√	√		√		√	√	√		√	√	√		√	√	√	√	
	AA2052	Galaxies Beyond the Milky Way	O	√	√	√	√		√	√	√	√	√	√	√			√	√		
	AA2053	UVOIR Astronomy	O	√	√		√	√		√	√		√	√		√	√	√	√		
	AA2054	Exploring the Solar System	O	√		√			√		√		√	√			√		√	√	
	AA2055	Solar Astrophysics	O	√	√	√	√			√	√	√	√	√	√	√	√	√	√	√	
	AA2056	Solar-Stellar Connection	O	√	√	√	√				√		√	√			√	√	√	√	
LEVEL 4	AA1051	Introduction to Astronomy	Comp	√	√		√	√		√	√	√		√		√	√	√	√	√	
	AA1053	Introduction to Cosmology	O	√	√	√					√			√			√	√	√	√	
	AA1055	IT for Astronomy	O						√	√	√		√			√		√	√	√	
	AA1056	Energy, Matter and the Universe	Comp		√							√			√			√	√		
	AA1057	Investigations in Astronomy	O	√		√	√		√		√		√	√	√	√	√		√	√	
	AA1058	Sun, Earth and Climate	O	√	√	√	√	√		√	√			√		√	√	√	√	√	
	AA1059	Introduction to Astrobiology	O	√			√				√		√	√		√	√	√	√	√	
	AA1066	Great Astronomers in History	O			√					√		√				√		√	√	

Note: *Mapping to other external frameworks, e.g. professional/statutory bodies, will be included within Student Course Handbooks*

Learning outcomes for the award of: _____BSc in Astronomy_____

A1. describe and explain some structures of the universe and the processes that take place within it in terms of the underlying physical laws, including some at (or informed by) the forefront of astronomy.
A2. solve a range of advanced problems in astronomy using physical and advanced mathematical techniques
A3. discuss and quantify uncertainties and limitations of some astronomical theory
A4. discuss the techniques of observational astronomy and their limitations

B1. design and implement astronomical observations
B2. use investigative techniques to retrieve astronomical information from on-line/library data sources
B3. analyse and process astronomical data taking into account the uncertainties
B4. plan and prepare a substantial scientific report on a topical astronomical subject.
B5. use a range of advanced mathematical techniques and physical laws to solve problems

C1. review and analyse information in a critical way from a variety of sources (including scientific papers)
C2. Formulate problems in precise terms and think analytically and critically about scientific ideas in order to develop logical arguments and draw conclusions.
C3. synthesise different strands of a theory or problem to produce a solution
C4. plan and implement an investigation individually. Critically analyse the outputs and evaluate their significance.

D1. use written communication skills effectively to produce scientific documents.
D2. use advanced numerical skills
D3. work independently to plan and manage own time to achieve specific objectives
D4. use scientific IT skills effectively to produce publication-style documents.

Learning outcomes for the award of: _____Dip HE in Astronomy_____

A1. describe and explain some structures of the universe and the processes that take place within it in terms of the underlying physical laws.
A2. solve a range of problems in astronomy using physical and mathematical techniques
A3. discuss uncertainties and limitations of astronomical theory
A4. discuss the techniques of observational astronomy and their limitations

B1. design and implement astronomical observations
B2. retrieve astronomical information from on-line/library data sources
B3. analyse and process astronomical data taking into account the uncertainties
B4. plan and prepare accurate scientific reports and essays on a specific astronomical topic
B5. use simple mathematical techniques and physical laws to solve problems

C1. review and analyse information from a variety of sources

C2. Think analytically and critically about scientific ideas in order to develop logical arguments and draw conclusions
C3. synthesise different strands of a theory or simple problem to produce a solution
C4. plan and implement a brief investigation.

D1. use written communication skills effectively
D2. use numerical skills
D3. work independently to plan and manage own time to achieve specific objectives
D4. use scientific IT skills effectively to produce publication-style documents

Learning outcomes for the award of: _____Cert HE_____

A1. describe and explain the basic structures of the universe and the processes that take place within it in terms of some underlying physical laws.
A2. solve a range of simple problems in some areas of astronomy using simple mathematical techniques
A4. describe some simple techniques of observational astronomy and their limitations

B1. design and implement simple astronomical observations
B2. retrieve some types of astronomical information from on-line/library data sources
B3. analyse and process astronomical results
B4. plan and prepare scientific reports and essays on a specific astronomical topic
B5. use simple mathematical techniques to solve simple problems

C1. analyse information from a given source
C2. develop logical arguments and draw conclusions about astronomical results.
C3. solve elementary problems
C4. implement a brief investigation

D1. use written communication skills
D2. use numerical skills
D3. plan and manage own time to achieve specific objectives
D4. use scientific IT skills to communicate and produce documents