Programme Specification[1]

1. Programmes:

Programme Title	UCAS GU Code Code
MSc in Astrophysics	Q77F6QQS

2.1 SCQF Level:

11

2.2 Credits:

180

3. Awarding Institution:

University of Glasgow

4. Teaching Institutions:

University of Glasgow

5. College:

College of Science and Engineering

6. School:

Physics and Astronomy [REG30600000]

7. Programme Accredited By:

N/A

8. Entrance Requirements:

[1] This 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 full advantage is taken of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each course can be found in course handbooks and other programme documentation and online at www.gla.ac.uk

The accuracy of the information in this document is reviewed periodically by the University and may be checked by the Quality Assurance Agency for Higher Education.

Please refer to the current graduate prospectus at: http://www.gla.ac.uk/postgraduate/

9. Programme Aims:

Astrophysics involves the observational and theoretical study of the astrophysical universe, ranging from solar system objects through stars, to galaxies and the structure of the universe as a whole. It draws on all branches of physics, including nuclear and particle physics, electromagnetism, dynamics and gravitation, with principles of optics and materials physics entering via astronomical instrumentation. In this MSc programme we aim to give the student an in-depth understanding of the principles and methods of modern astrophysics, and the skills to apply this understanding to a range of theoretical, observational and practical problems, at a level appropriate for a professional scientist. The programme will draw upon a wide range of advanced M-level lecture courses delivered within the Department of Physics & Astronomy: in addition to undertaking core theoretical and observational courses and courses that build key research skills, students will have the flexibility to tailor their choice of elective lecture courses and project work to a wide variety of specific areas of astrophysics research and its applications, including astrophysics research performed in the Department of Physics & Astronomy.

Specific Aims of the Programme

(1) To present an in-depth integrated course of study that describes, analyses and relates the principles of modern astrophysics at a level appropriate for a professional scientist;

(2) To develop the student's competence in the application of methods of mathematics and physics in an astrophysical context;

(3) To provide the opportunity to study in depth a choice of advanced treatments and applications to aspects of modern astrophysics;

(4) To provide the opportunity to apply measurement, problem-solving and critical assessment, and communication skills in performing and writing a report on an extended and demanding project;

(5) To develop problem solving abilities, critical assessment and communication skills, to a level appropriate for a career of leadership in academia or industry;

(6) To encourage students to work effectively, to develop a professional attitude to what they do and to take full responsibility for their own learning.

10. Intended Learning Outcomes of Programme:

The programme provides opportunities for students to develop and to demonstrate knowledge and understanding, skills, qualities and other graduate attributes in the following areas.

Knowledge and Understanding:

By the end of this programme students will be able to:

- Explain the fundamental principles that underpin modern theoretical and observational astrophysics, particularly their importance to the core areas of stellar astrophysics; plasma astrophysics, galaxies and cosmology; gravitational physics and statistical physics;
- Discuss current research themes in astrophysics, explaining where appropriate the relevance of advanced mathematical, computational and data analysis methodology to their study.

Skills and Other Attributes:

By the end of this programme students will be able to:

Subject-specific/practical skills

- Use a high level computer language or professional-level astronomical software to solve physical problems and analyse data from astronomical sources;
- Plan and execute experimental investigations of physical processes using both standard and

advanced bench and astronomical equipment, of complex physical systems or processes, demonstrating logic, initiative, and decision making skills in solving problems encountered;
- Evaluate random and systematic uncertainties inherent in experimental measurements;
- Make a critical analysis and drawing valid conclusions from the results of experimental investigations;
- Recover, evaluate and summarise the professional literature and material from other sources concerned with a chosen area of physics or astronomy, and preparing a written analysis of the current position in the chosen area, which should include a critical comparison of the material and a discussion of likely future developments;
- Plan the course of action required to achieve self-defined goals in an open-ended (astro)physics project;
- Write clear and concise reports in a scientific style;

Intellectual skills

- Describe and analyse quantitatively processes, relationships and techniques related to the areas covered in the contributory courses;
- Write down, and where appropriate either prove or discuss the underlying basis of, physical laws related to topics in these areas;
- Analyse critically, and solve using appropriate mathematical tools, advanced or complex problems, which may include unseen elements, related to topics included in the course component outlines;
- Demonstrate a critical awareness of the significance and importance of the topics, methods and techniques discussed in the lectures and their relationship to other concepts in courses taken.

Transferable/key skills

- Perform an in-depth literature study of a scientific topic;
- Prepare and give an audio-visual presentation on the topic;
- Make a preliminary definition of goals to be achieved during open-ended project work and revise these goals and strategies for completion of the work in the light of results achieved and difficulties encountered;
- Prepare an abstract of experimental or project work performed in the accepted scientific format;
- Write a report containing a full description of the aims, methods, outcomes and conclusions of a laboratory investigation or extended piece of project work, including a critical evaluation of the significance of the work, and how it compares with earlier work done in the same area;
- Apply logical analysis to problem solving;
- Interact positively with colleagues in a small group context;
- Appreciate the nature of open problems.

11. Assessment Methods:

The programme will employ a wide range of assessment methods:

Knowledge and understanding:

Written examinations

Verbal and written reports of practical and IT work

Multiple choice questions

Intellectual skills:

Written examinations

Verbal and written reports of practical and IT work

Multiple choice questions

Subject-specific/practical skills:

Verbal and written reports of practical and IT work

Verbal, written and poster presentations of project work

Transferable/key skills:
Verbal and written reports of practical and IT work
Oral and written presentations of Group project work, and assessments by supervisors
Written and poster presentations of project work, and assessment by supervisors

12. Learning and Teaching Approaches:

The programme will draw upon a wide range of approaches to learning and teaching:

Knowledge and understanding:
Lectures and class tutorials
Small group supervisions
Practical and project work
Private study

Intellectual skills:
Lectures and class tutorials
Small group supervisions
Practical work, including IT laboratory
Private study

Subject-specific/practical skills:
Practical work, including IT laboratory
Individual and group project work

Transferable/key skills:
Problem solving skills workshop
Extended theoretical project
Small group supervisions

13. Relevant QAA Subject Benchmark Statements and Other External or Internal Reference Points:

This Programme Specification is informed by the QAA Benchmark Statement for Physics, Astronomy and Astrophysics, which can be found at http://www.qaa.ac.uk/academicinfrastructure/benchmark/

14. Programme Structure and Features:

The MSc in Astrophysics programme lasts 1 year and contains a minimum of 180 credits. Students undertake a minimum of 120 credits in Semesters 1 and 2 and are assessed on these courses either via continuous assessment, or unseen examination in the May/June examination diet, or a combination thereof.

The remaining 60 credits will take the form of an extended MSc project on a specific aspect of theoretical or computational physics. The student will conduct this project while embedded within a particular research group – under the direct supervision of a member of academic staff.

Programme Structure

The curriculum undertaken by each student will be flexible, and tailored to the prior experience and expertise of the student and his/her particular research interests. Generally, however, courses taken in Semester 1 and 2 will focus on building core theoretical and practical skills, and key research skills (in preparation for the extended project). An example curriculum is outlined below

Astronomy Laboratory (15 credits, H-level course)
Cosmology (15 credits, H-level course, alternate years starting 2010-11)
General Relativity and Gravitation (15 credits, M-level course, alternate years starting 2010-11)
Pulsars and Supernovae (15 credits, M-level course, alternate years starting 2010-11)
Stellar Astrophysics (15 credits, H-level course, alternate years starting 2011-12)
Plasma Theory and Diagnostics (15 credits, M-level course, alternate years starting 2011-12)
Statistical Astronomy (15 credits, M-level course, alternate years starting 2011-12)
Problem Solving Workshop (10 credits, M-level course)
Research Skills (10 credits, M-level course)
Gravitational Wave Detection (10 credits, M-level course)
Statistical Mechanics (10 credit, M-level course)
Dynamics, Electrodynamics & Relativity (10 credits, M-level course)
Advanced Electromagnetism (10 credits, M-level course)
MSc project (60 credits, M-level course)

15. Additional Relevant Information:

Support for students is provided by the Postgraduate/Undergraduate Adviser(s) of Studies supported by University resources such as the Effective Learning Adviser located in the Student Learning Service (http://www.gla.ac.uk/services/tls/sls/), the Student Counselling and Advisory Service (http://www.gla.ac.uk/services/counselling/), the Student Disability Service (http://www.gla.ac.uk/services/studentdisability/) and the Careers Service (http://www.gla.ac.uk/services/careers/).

16. Academic Session:

2010-11

Additional Administrative Information to be completed:

17. Fee Type:

Standard

18. Attendance Type:

Full Time

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