

**Programme specification for****MSc in  
Relativity Astrophysics and Cosmology**

1	<b>Awarding institution</b>	University of Newcastle upon Tyne
2	<b>Teaching institution</b>	University of Newcastle upon Tyne
3	<b>Final award</b>	MSc
4	<b>Programme title</b>	Relativity, Astrophysics and Cosmology
5	<b>Programme accredited by</b>	
6	<b>University code</b>	9233
7	<b>QAA subject group</b>	Physics and Astronomy

8	<b>Date of revision</b>	December 2004
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**9 Programme Aims**

To provide specialist training in relativity, astrophysics and cosmology and related areas.

To provide a possible route into PhD programmes for students who have the necessary ability.

**10(a) Programme Intended Learning Outcomes**

At the end of their MSc programme successful students will have developed:

**A** *Knowledge and understanding*

- A 1 a sound knowledge and understanding of the relevant areas of relativity,
- A 2 a sound knowledge and understanding of the relevant areas of astrophysics,
- A 3 a sound knowledge and understanding of the relevant areas of cosmology,
- A 4 an awareness of current research problems in the relevant areas.

**B** *Subject-specific / Practical skills*

- B 1 experience of postgraduate research through an extended project.

**C** *Cognitive skills*

- C 1 graduate level analytical, critical evaluation and problem solving skills.

**D** *Key skills*

- D 1 in problem solving,
- D 2 and the ability to communicate, in writing and orally, in a manner appropriate to the target audience.

## **10(b) Teaching and Learning Methods and Strategies**

### **A Knowledge and understanding**

#### ***Teaching Strategy***

The primary method for teaching knowledge and understanding of the fundamental aspects of relativity, astrophysics and cosmology ( A1, 2, 3 ) is through lectures supplemented by marked exercises set by the lecturers where students gain a greater insight into the topics.

An awareness of research problems (A4) is achieved mainly through *Research Topics in Astrophysics* MAS803 and the *MSc Project* MAS523.

#### ***Learning Strategy***

Students are encouraged to participate, actively, in teaching sessions. The effectiveness of student learning is monitored and guided by work set and marked by the lecturer. Students are provided with reading lists and they are expected to read around the taught material to enhance their knowledge and understanding of the topics. The benefits of supplementary reading in textbooks and journal articles become more important in the research project where students gain experience of a research environment.

#### ***Assessment Strategy***

Assessment of the knowledge and understanding of the relevant topics ( A1, 2, 3 ) is mainly by unseen written examination papers. The assessment of student awareness of current research problems ( A4 ) is by seminars and where appropriate by project work.

### **B Subject specific / Practical Skills**

#### ***Learning Strategy***

The MSc project (MAS523) allows students to experience postgraduate research methods ( B1 ) at first hand. The MSc group is small and most of their learning takes place within an ethos of research so contributing to their research experience.

### **C Cognitive Skills**

#### ***Teaching Strategy***

Graduate analytical and critical evaluation skills (C1) are embedded in the approach adopted in the modules. Examples of processes and phenomena encountered in the modules are analysed in terms of physical laws and fundamental underlying principles.

#### ***Learning Strategy***

Analytical and critical evaluation skills (C1) are learnt through using a systematic approach to problem solving, computing exercises and through a reflective evaluation their outcomes. In Semester 3, the research project (MAS523) offers the opportunity to reflect on the methodology used in research.

#### ***Assessment Strategy***

Assessment of analytical and critical evaluation skills is an integral aspect of assessing the work submitted in written examinations, and in projects.

### **D Key skills**

#### ***Teaching Strategy***

Key skills appropriate for postgraduate students are taught in PHY524 through supervised practical sessions and take away exercises. Problem-solving (D1) is an integral part of the modules in the programme. It is taught specifically in the context of mathematics and physics but the systematic approach can be applied to a much broader range of problems. Written communications skills ( D2 )

are taught mainly in the advice given to students relating to the production of their research project and oral skills are taught through advice given to students in the *Modern Research Topics* module (MAS803).

**Learning Strategy**

Problem-solving skills are acquired by practice acquired by working through the set problems. The problem-solving skills acquired here are generic. Written skills are enhanced by writing an extended project. Oral communications skills are acquired by giving seminar presentations to fellow students.

**Assessment strategy**

Problem-solving (D1) is an integral aspect of most modules in the programme and is assessed as part of the module. Written communication (D2) is assessed in the research project report and the Seminar oral presentations are assessed.

**11 Programme Curriculum, Structure, and Features**

The MSc programme is studied over one year full time.

The programme is divided into three Semesters. The First and Second Semesters contain taught modules that are assessed at the end of the Semester. During the Third Semester students undertake an extended research project.

In Semesters 1 and 2 students are required to study of modules with a total credit value of 120 credits. The research project in Semester 3 is assigned a value of 60 credits. The total credit value required is 180 credits. Each credit requires a total student effort of 10 hours, that may include lectures, course-work, seminars, computing, private study, and revision.

Requirements for progression are set out in the University Degree Programme Regulations and in the Examination Conventions.

*Semesters 1 and 2* contain topics in relativity (MAS822, MAS825, MAS314), astrophysics (MAS803, MAS315, PHY317), and cosmology (MAS804). Optional modules enable students to broaden their learning experience. Students must pass the written assessments in Semester 1 and Semester 2 if they are to proceed to the research project.

*Semester 3* contains a 60 credits research project (MAS523).

Particular features of the programme are:

- (i) The programme offers the opportunity to study the interrelated topics of relativity astrophysics and cosmology under the guidance of expert staff,
- (ii) There is an opportunity to augment your skills in mathematics and physics,
- (iii) there is a substantial project in Semester 3.

### MSc Astrophysics, Relativity and Cosmology Programme Structure

**Semester 1**

<i>Code</i>	<i>Title</i>	<i>Value</i>	←---- <i>Learning outcomes</i> ----→				
MAS813	Real Fluids	(15)	Cp			C1	D1
MAS804	Cosmology	(10)	Cp	A3		C1	D1,2
MAS823	Further Modelling	(10)	Rec				D1
MAS313	Num. and comp. modelling	(10)	Rec	A1			D1
MAS315	Stellar Structure (10)		Op	A2		D1	
MAS314	Special Relativity	(10)	Op	A1			D1
MAS651	Mathematics Methods	(10)	Op	A1			D1

**Semester 2**

MAS803	Research Topics in Astrophys.	(10)	Cp	A1		C1	D1,2
MAS822	General Relativity	(15)	Cp	A1		C1	D1
MAS824	Modern Computer Skills (10)		Cp			D1,2	
MAS825	Developments in Relativity	(10)	Op	A1		C1	D1
MAS821	Quantum Field Theory	(10)	Op	A1		C1	D1
PHY318	Particle Physics (10)		Op	A3		D1	
PHY317	Physics of Interstellar Medium	(10)	Op	A2			D1,2
MAS329	Numerical Recipes	(10)	Op				D1
MAS317	Instabilities	(10)	Op				D1
MAS625	Mathematical Modelling	(10)	Op				D1
MAS610	Astro. Fluids and Binary Stars	(10)	Op	A2			D1
MAS627	Complex Variable	(10)	Op				D1

**Semester 3**

MAS523	Project (MSc R, A, C)	(60)	Cp	A4	B1	C1	D1,2
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AVERAGE WEIGHTED MARK OF 50

PASS THE PROJECT



AWARD OF MSc

Cp: compulsory module. Rec: Recommended module. Op: Option module

## 12 Criteria for Admission

### *Entrance requirements*

A second class honours degree in mathematics or in physics.

### *Admissions policy*

To offer a place, without discrimination, to suitably qualified applicants that have an academic interest in the programme

### *Arrangements for non-standard entrants*

Normally, non-standard entrants are interviewed. Applicants from abroad are not required to visit Newcastle before an offer is made but they are very welcome to come. Where English is not their first language applicants must have a competence equivalent to IELTS 6.0 or a TOEFL score of 6.0 or above.

## 13 Support for Students and their Learning

### *Induction*

An induction programme is provided for new students at the start of the programme. The aims and the learning outcomes of the programme of study are outlined and the way in which the learning outcomes are achieved and assessed. Students are informed of the facilities provided by the University. A handbook for the programme is issued detailing the content of the programme and information about the School and the responsibilities of the staff.

### *Study skills support*

Advice on study skills is offered during Induction Week. The Personal tutors offers advice on how to study effectively. Self-tuition support is provided by the University Library. Where appropriate, advice on specific study methods is offered within the modules.

### *Academic support*

Induction sessions give general advice at the start of each academic year. Personal tutors offer further advice appropriate for individual students. There is access to the Degree Programme Director throughout the year and access to the University Student Office regarding welfare or any problems that might affect a student's progress.

### *Pastoral support*

Each student is assigned a personal tutor who provides pastoral care, advises on module selection and takes an overview of students' performance. The University also offers students help by trained counsellors. There is access to the University Accommodation Office, the Student resources, notably the Welfare Officer and access to the University Careers Service

### *Support for Special Needs*

The University Disability Unit offers help and advice through a Disability Officer.

### *Learning resources*

Registered students have access to the Robinson Library and have access to both University and School based computer facilities.

### *Monitoring Student Progress*

The performance of all students is monitored by the Degree Programme Director.

## 14 Methods for evaluating and improving the quality and standards of teaching and learning

The standards and quality of the programmes are monitored continuously by reference to feedback from staff, students, external examiners and by regular reviews.

*Module reviews*

Modules are reviewed each year by module leaders in the light of the experience gained in teaching the module and feedback from student evaluation questionnaires.

*Programme reviews*

The Board of Studies reviews the programme regularly in order to enhance and develop it. Staff and student evaluations are considered. The Board considers progression rates, degree classes achieved and graduate employment statistics.

*External examiner reports*

Each year the Board of Studies reviews the comments made by the External Examiner, and confirms any action points to the SAgE Faculty Office.

*Student evaluations*

Student evaluation of the modules is sought annually. The modules are reviewed by module leaders in the light of student comment. Further information may be obtained from the Staff-Student Committee.

*Feedback Mechanisms*

Feedback is through the Staff-Student Committee.

*Faculty and University Review Mechanisms*

The University has a regular system of Annual Monitoring and Review.

**15 Regulation of Assessment**

*Pass Mark*

The pass mark in all modules is 50. Modules are marked in accordance with published marking criteria. Details of the assessment methods are given in the module descriptors.

*Course Requirements*

Normally, students are required to pass all modules to progress to the following Stage. Module marks are combined in proportion to their weighted credit value. Limited compensation of marginally failed modules is permitted. Resit opportunities are available.

*Weighting*

When determining the overall average the marks from the modules shall be weighted in proportion to their credit value.

*The University Common Marking Scheme for taught postgraduate programmes is*

70 or more-	Pass with Distinction
60 - 69	Pass with Merit
50 - 59	Pass
49 or less	Fail.

*Role of the External Examiner*

The External Examiner, who is a distinguished members of the academic community, is appointed by SAgE FTLC on the recommendation of the Board of Studies.

The External Examiner approves written questions, advises on their standard, vets their assessment and the assessment of the project and other written work.

The External Examiner may interview graduating students to assist the evaluation of their degree classification and/or a means of establishing the comparability of the standards of the programme. The External Examiner attends the meeting of the Board of Examiners normally held at the end of the academic year that advises on degree

classifications, contributes to the evaluation process.

The External Examiner reports to the University on the conduct of the examining process and the comparability of the standards of the programme.

## **16 Indicators of Quality and Standards**

### *School Reviews*

The School of Mathematics and Statistics was awarded an excellent 23 out of 24 points in a review by the QAA. In the national Research Assessment exercise held in 2001 Pure Mathematics and Statistics were each awarded grade 5 and Applied Mathematics was awarded grade 4.

### *Internal Review Reports about the programme*

This programme has become operational only recently and has not been subject to internal review.

## **17 Disclaimer and further information**

This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided. It should be noted that there may be variation in the range of learning opportunities reflecting the availability of staff to teach them.

While every effort will be made to ensure that the module or modules described in the programme specification are available, this cannot be guaranteed.

The accuracy of the information contained here is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

In addition, information relating to the course is provided in:

The University of Newcastle Postgraduate Prospectus  
The Degree Programme Handbook  
The University Regulations  
The Degree Programme Regulations