The University Of Sheffield.

Programme Specification

A statement of the knowledge, understanding and skills that underpin a taught programme of study leading to an award from The University of Sheffield

Programme Details

1. Programme title	Astrophysics
2. Programme code	PHYT27
3. QAA FHEQ level	7
4. Faculty	Science
5. Department	Department of Physics and Astronomy
6. Other departments providing credit bearing modules for the programme	Not applicable
7. Accrediting Professional or Statutory Body	Not applicable
8. Date of production/revision	June 2022

Awards	Type of award	Duration
9. Final award	MSc	12 months
10. Intermediate awards	PGDip	9 months
	PGCert	9 months

Programme Codes

11. JACS code(s) *Select between one and three codes from the HESA website.*	F510		
12. HECoS code(s) *Select between one and three codes from the HECoS vocabulary.*	100414	100415	

Programme Delivery

13. Mode of study	Full-time
14. Mode of delivery	Face to face (on campus), There will be a non-assessed distance learning aspect prior to the start of the course to help those without an astronomy background to familiarise themselves with key basic concepts.

15. Background to the programme and subject area

The Physics and Astrophysics integrated MPhys programme is one of the most popular degree programmes offered by the Department of Physics and Astronomy, and is consistently rated highly in student feedback. Other universities do not offer as large an astrophysics component to their Physics degrees as Sheffield, so we chose to set up this programme to enable students who had already done a Physics degree (or similar) to benefit from the comprehensive range of astrophysics modules we are able to offer. This programme is ideal for those students who wish to pursue a career in astrophysics research or teaching, but whose first degree did not cover sufficient astronomy and astrophysics to pursue that goal.

16. Programme aims

MSc Astrophysics aims to:	
A1	Provide students with a broad understanding of astrophysics and how astronomical research is conducted.
A2	Develop in students the technical skills required to pursue a PhD and/or a career in astronomical research.
A3	Provide research-led teaching in astrophysics which reflects current developments in the field.
A4	Develop students' ability to undertake self-directed learning.
A5	Develop and enhance students' capacity to engage in extended research and prepare them for further academic study and employment.

17. Programme learning outcomes

Knowledge and understanding
On successful completion of the programme, students will be able to demonstrate knowledge and understanding of:

		Links to Aim(s)
K1	Advanced areas of astrophysics.	A1
K2	Areas of current astrophysics research to a level appropriate as a foundation of astrophysics research.	A1
K3	How research into various areas of astrophysics is conducted.	A2
K4	How to effectively communicate research findings.	A3-A5

K5	Key developments, experimental, computational or analytical techniques and background literature in the subject area of their research project.	A1-A5
Skills and other attributes On successful completion of the programme, students will be able to:		
S1	Evaluate and analyse written source material at a research level, i.e., primary or review papers in scientific journals, as well as other appropriate sources.	A3-A5
S2	Propose new solutions, or apply previously-developed solutions to a new situation, to a range of problems including those encountered in a research environment.	A3-A5
S3	Plan and carry out advanced project work in a research environment.	A4, A5
S4	Summarise and present the results of research-level investigations both orally and in writing.	A3
S5	Use research-grade observing facilities, and process and analyse the data obtained via these facilities.	A2
S6	Develop and use programming skills relevant to the processing and analysis of astronomical data.	A2
S7	Evaluate current research and critique methodologies.	A2-A5
S8	Assess the validity of theories by conducting hypothesis testing based on observations.	A2-A5

18. Learning and teaching methods

Development of the learning outcomes is promoted through the following teaching and learning methods:

Lectures: A student must possess a substantial amount of knowledge across a broad range of areas of astrophysics in order to achieve the standard expected of a postgraduate qualification. This knowledge will primarily be delivered via lectures supported by problems classes where necessary. Most of the lecture courses are 15-credit modules consisting of around 20 lectures each.

Research Seminars: The astronomy group in the Department of Physics and Astronomy host regular seminars during term-time. These seminars are delivered by non-Sheffield-based academics conducting cutting-edge research in various areas of astronomy. Attendance at these seminars will be mandatory for our MSc students in order for them to acquire knowledge of current research priorities within astronomy.

Tutorials: Students will be required to attend tutorials during which they will learn and develop skills in using observational facilities, report writing, and oral and visual presentation skills. Personal tutorials will also provide a focus for personal academic and career development.

Workshops: Students will also be required to attend workshops during which they will learn programming skills relevant to the processing and analysis of astronomical data.

Oral Presentation: Students will be provided with training in preparing and delivering effective oral presentations. They will be given examples of good practice and will have the opportunity to practice their own presentations using the projection equipment in the department's lecture theatres and/or classrooms. Students will be given formative and summative feedback on the presentations they deliver.

Research Project: A major piece of independent research forms the focal point of the programme

allowing students to apply the knowledge and skills they have developed to research an important issue or problem in astrophysics. Through this unit students apply their research, methodological and writing skills by independently designing and conducting a research project based on the analysis of empirical data. This will involve bibliographic searches, the use of qualitative and/or quantitative research techniques, handling and analysing data and writing up and reporting findings in an oral presentation. To guide students through this process, students will attend weekly one-to-one meetings with a project supervisor who will be assigned to them at the start of the year. The project supervisors will all be research-active academics who can provide training in all the aforementioned research skills.

19. Assessment and feedback methods

1. Formal examinations
Most taught modules are assessed primarily by formal examinations which typically account for between 60% and 80% of the module grade. Formal examinations provide effective tests of knowledge and problem-solving skills. Most examination papers include a compulsory element accounting for 30–40% of the paper, designed to demonstrate that students possess a basic overview of the subject matter, and a choice of more searching questions demonstrating detailed knowledge of some aspects of the material. Questions are structured and are presented with an indicative marking scheme.

2. Formative and summative assessment
Most taught modules have an element of summative assessment (homeworks or class tests) during the semester - as opposed to final examinations - that also form the basis of formative feedback. For example, written feedback (formative) that is provided to students in addition to their mark (summative) for a piece of homework, or providing an explanation of a model answer to a particular homework/test question. Some modules, however, (e.g., Observational Astronomy, Research Skills modules, and particularly the Physics Project) involve significant levels of formative feedback throughout the module via face-to-face interaction with supervisors/course leaders and written feedback following draft report submission.

3. Research skills assessment
Research skills will be assessed through a series of coursework submissions covering tasks such as literature review, project planning and presentations.

A diary and reflection element will be introduced in the first semester to encourage reflective practice and will continue throughout the project work. Diary and reflection will be marked with the project report and an element of the viva will be to discuss the diary and reflection.

4. Research Project assessment
In addition to assessment of skills through the research diary, the research project will be assessed through a combination of a written scientific report, a presentation and a viva voce examination. All components will be double marked.

20. Programme structure and student development

All students will take 90 credits worth of taught modules and undertake a 90-credit research project that includes research skills development. Students will be required to take several compulsory taught modules to establish base knowledge in the discipline as well as choosing the majority of their credits from a range of approved optional modules.

A particular attraction of the course is expected to be the opportunity to spend a week during Spring/Summer with a member of teaching staff on the summit of La Palma (one of the world's top observing sites). This residential course experience will be unique among UK astronomy MSc Programmes and is possible due to the close links that the astronomy research group at TUoS have with the institutes, astronomers and the facilities based in the Canary Islands. During their visit, students will spend their mornings attending lectures on Astronomical Techniques (telescopes, instrumentation and detectors) given in the mountain-top lecture theatre. In the afternoon, students

will be taken to the various telescopes on the site to see examples of the telescopes, instruments and detectors that they will have just been taught about, thereby giving a direct connection between theory and practice. In the night, students will have the opportunity to observe with the telescopes and instruments on La Palma, including the department's own telescope there. (https://sites.google.com/site/point5metre/home).

Irrespective of a student's prior experience, the MSc programme is structured to allow students to gain the knowledge and skills required to undertake an extended programme of independent research. Students that join the programme with limited astronomical data analysis skills will learn these skills during the first semester in preparation to conduct their research project. Also during the first semester, and alongside the taught modules, all students will start their reflective practice by conducting a comprehensive literature review focused on the particular scientific area of their research project. This will be followed in the second semester by further reflective practice and the development of generic skills through the writing of an article and delivery of a presentation pitched to an educated, general audience.

Detailed information about the structure of programmes, regulations concerning assessment and progression and descriptions of individual modules are published in the University Calendar available online at http://www.sheffield.ac.uk/calendar/.

21. Criteria for admission to the programme

Detailed information regarding admission to programmes is available from the University's On-Line Prospectus at http://www.shef.ac.uk/courses/.

22. Reference points

The learning outcomes have been developed to reflect the following points of reference:

Subject Benchmark Statements
https://www.qaa.ac.uk/quality-code/subject-benchmark-statements

Framework for Higher Education Qualifications (2014)
https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf

University Strategic Plan
http://www.sheffield.ac.uk/strategicplan

Learning and Teaching Strategy (2016-21)
https://www.sheffield.ac.uk/polopoly_fs/1.661828!/file/FinalStrategy.pdf

23. Additional information

None

This specification represents a concise statement about the main features of the programme and should be considered alongside other sources of information provided by the teaching department(s) and the University. In addition to programme specific information, further information about studying at The University of Sheffield can be accessed via our Student Services web site at http://www.shef.ac.uk/ssid.