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	Physics
2. Programme code	MPST003
3. QAA FHEQ level	7
4. Faculty	Science
5. School	Mathematical and Physical Sciences
6. Other Schools providing credit bearing modules for the programme	None
7. Accrediting Professional or Statutory Body	Not applicable
8. Date of production/revision	March 2024

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

Programme Codes

11. JACS code(s) *Select between one and three codes from the HESA website.*	F300		
12. HECoS code(s) *Select between one and three codes from the HECoS vocabulary.*	100424	100425	100426

Programme Delivery

13. Mode of study	Full-time
14. Mode of delivery	Face to face (on campus)

15. Background to the programme and subject area

The School of Mathematical and Physical Sciences has a rich and distinctive undergraduate curriculum. The research project will involve significant amounts of self-directed learning and taught modules involving research-led teaching.

Our proposal is for a Physics MSc that is a taught master's-level course for students who hold an undergraduate degree in Physics (or an equivalent subject). The course aims to bring students close to the cutting edge of current research and prepare them for a career in Physics, either in research or elsewhere.

Students can choose taught elements relevant to their career interests from a wide variety of topics including, but not limited to:

- Advanced Quantum Mechanics
- Cosmology
- Solid State Physics
- Particle Physics

Students will also undertake an extensive research project within the School, which is expected to take half of their study time.

16. Programme aims

MSc Physics aims to:	
A1	Provide students with a broad understanding of topics at the cutting edge of current Physics research including, but not limited to: 1) Semiconductor Physics and Technology. 2) Quantum Mechanics. 3) Particle Physics. 4) General Relativity. 5) Soft Matter and Biological Physics.
A2	Provide students with the technical skills and experience required to pursue a PhD and/or a career in Physics research including: 1) Computer Programming. 2) Data analysis. 3) Planning and undertaking a research project.
A3	Develop students' scientific research skills including reviewing the research literature, report-writing, and oral communication
A4	Develop students' ability to undertake self-directed learning.
A5	Develop students' ability to conduct novel research.

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 topics in Physics that are based in current research	A1
K2	How research into various areas of Physics is conducted.	A2, A5
K3	How to effectively communicate research findings.	A3 – A4
K4	Key developments, techniques and background literature in the subject area of their dissertation project.	A1 – A5
Skills and other attributes On successful completion of the programme, students will be able to:		
S1	Applying written source material for academic purposes, i.e. primary or review papers in scientific journals, as well as other appropriate sources.	A3 – A5
S2	Plan and carry out advanced project work in a research environment.	A4, A5
S3	Summarise and present the results of research-level investigations both orally and in writing.	A3
S4	Evaluate current research and critique research methodologies.	A4 – A5
S5	Apply modern computer languages for the tasks of processing and analysing experimental data.	A2
S6	Approach problems in a methodical manner and obtain appropriate solution(s).	A3 – 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 Physics in order to achieve the standard expected of a postgraduate qualification. This knowledge (K1-K3, K5) will primarily be delivered via lectures supported by problems classes (S6) where necessary. Most of the lecture courses are 15-credit modules consisting of around 20 lectures each.

Research Seminars: The research groups in the School of Mathematical and Physical Sciences host regular (roughly weekly) seminars during term-time. These seminars are delivered by non-Sheffield-based academics conducting cutting-edge research in various areas of Physics. Attendance at these seminars will be mandatory for MSc students in order for them to acquire knowledge of current research priorities within Physics (K1-K5).

Oral Presentation: Students will develop oral presentation skills in preparation for their project viva (S1, S3).

Tutorials: Students will be required to attend tutorials during which they will learn and develop skills in using experimental equipment, report writing, and oral and visual presentation skills. The tutorials will also provide a focus for personal academic and career development (S1-S5).

Workshops: Students may also be required to attend workshops during which they will learn

programming and/or practical skills relevant to the processing and analysis of experimental data.

Dissertation 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 Physics. 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, or the development of theoretical techniques. This will involve bibliographic searches, the use of qualitative and/or quantitative research techniques, handling and analysing data and reporting findings in written and oral form (K1-K5, S1-S6).

19. Assessment and feedback methods

1) Formal examinations

Most taught modules are assessed primarily by formal examinations (2 hours for a 15-credit module) which typically account for between 60% and 80% of the module grade. Formal examinations provide effective tests of knowledge (K1–3) and problem-solving skills (S6). 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 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. These mid-semester assessments typically represent up to 20-40% of the final grade of the module. Some modules, however, (e.g. Physics in an Enterprise Culture, and particularly the Dissertation 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) Literature Review and Reflective Practice

A literature review will be introduced early in the first semester and assessed by double marking of the literature review (30%; K1-K5, S1, S3, S4). Students will be asked to reflect upon the provided feedback and project achievement (40%, K1, K3, K5, S1, S2, S4) and students will be asked to give an Oral presentation of key project findings (30%; K4, S3).

4) Dissertation project assessment

The final dissertation will be assessed via an assessment of the research records kept (25%; K2, S1, S2, S4), a Viva voce examination of the dissertation work (25%; K1, K3, K4, S3, S4) and a 10,000-word dissertation (50%; K1 – K4, S1 – S6).

20. Programme structure and student development

All students will take the dissertation module, the School's suspended 60 credit Research Project in Physics or Astrophysics (PHY6008). The other core module is the suspended 30 credit Research Skills (PHY6340). Students are then free to choose from an additional 90 credits from the wide range of approved optional modules.

It is anticipated that students will choose optional modules that support the intended subject area for their research project. Students will be asked to identify a dissertation research area, e.g. Particle Physics, Solid State Physics, Solar Technologies, during the module choice period. This chosen research area will inform advice from student support about suitable module choice.

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 data analysis skills will learn these skills during the first semester in preparation to conducting 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.

Assessment for taught modules is primarily by formal examinations (2 hours for a 15-credit module) which typically account for between 60% and 80% of the module grade. Formal examinations provide effective tests of knowledge (K1–3) and problem-solving skills (S6). 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.

Assessment of the research project is split between three components. The main piece of assessment is a 6-10,000-word dissertation (50%; K1 – K4, S1 – S6). The final dissertation will be assessed via an assessment of the research records kept (25%; K3, S1, S2, S4), a Viva voce examination of the dissertation work (25%; K2, K4, K5, S3, S4). The PHY6340 module will support the student's research skills. A literature review will be introduced early in the first semester and assessed by double marking of the literature review (30%; K1-K5, S1, S3, S4). Students will be asked to reflect upon the provided feedback and project achievement (40%, K1, K3, K5, S1, S2, S4) and students will be asked to give an Oral presentation of key project findings (30%; K4, S3).

Awards of degrees and questions of progression will be made in line with Regulation XVI. Students must have passed at least 165 credits, *and* achieved an average grade of 50 or above *and* achieved a grade of 40 or above in each of the failed units for the award of a Master's Degree. For a postgraduate diploma, the same criteria apply, but the credit requirement is reduced to 105 credits.

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/.

Minimum 2:1 BSc or 4-year Masters' degree in Physics or a closely related subject. We will also consider students with a 2:2 or equivalent degree on a case-by-case basis. For international students, we require English language qualifications in line with the School standard (Overall IELTS score of 6.5 with a minimum of 6.0 in each component, or equivalent).

Applicants would apply via PG Online and we would require written references from their previous place of (undergraduate) study.

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 Vision and Strategic Plan
https://www.sheffield.ac.uk/vision

23. Additional information

This programme was approved in principle by the Learning and Teaching Committee within the School of Mathematical and Physical Sciences during their meeting in September 2023.

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 School(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.