PROGRAMME SPECIFICATION (Research Postgraduate)	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	Masters Research (MRes)
4	**Programme Title**	Masters Research in Physics
5	**Programme Code**	4866F/P: MRes Physics (Experimental) (4865F/P): MRes Physics (Theoretical)
6	**Programme Accreditation**	N/A
7	**QAA Subject Benchmark(s)**	Physics
8	**FHEQ Level**	7
9	**Last updated**	May 2023

10 Programme Aims

This programme has been designed to provide students with opportunities to develop a scholarly approach to a chosen area of research in physics. The programme aims to help students acquire the necessary expertise for effective day-to-day management and reporting of research activities in the context of their own roles, responsibilities and interests.

1 Enable students to gain an advanced knowledge and understanding of self-selected areas of physics.
2 Enable students to undertake a general training in an area of research in a leading research laboratory within the University.
3 Encourage students to develop a range of professional and key skills which will enable them to engage in teaching and/or research at an advanced level in higher education or in a senior professional capacity in other fields of employment.
4 Enable students to exercise initiative and take personal responsibility.

11 Learning Outcomes

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

Knowledge and Understanding

On completing the programme students should demonstrate:
A1 an advanced knowledge in self-selected areas of special interest or professional relevance
A2 an appropriate knowledge of the principles of safe working practice (only relevant for experimental projects) and the principles behind modern techniques and tools that under-pin their chosen area of study
A3 an appropriate knowledge and understanding of the general scientific method and the tools and skillset required to prepare scientific articles
A4 how to plan and execute complex experimental or theoretical investigations, and to report the outcome of such investigations in a coherent manner.

Teaching and Learning Methods

Students undertaking the MRes select one knowledge module relevant to their chosen field of study. In addition, all students study two compulsory modules: “Research Skills I: Scientific Methods” and “Research Skills: Project proposal” and undertake a 2-semester research project. Subject knowledge module selection allows students a wide choice,

subject to module viability, timetabling and individual programme- specific requirements (see below) and is made in consultation with supervisors and the Degree Programme Director or nominees, and subject to confirmation by the Degree Programme Director. Students select areas to study that are within their own areas of interest and that are key to developing a better understanding of their project. A1 is addressed in the research project proposal. A2 is addressed through a mixture of lectures, small group discussion and workshop exercises, augmented by independent study, directed by the provision of reading lists, resource materials and by individual tutorial support, with feedback on in-course assignments. A3 and A4 are addressed in the research skills: scientific methods module provided by the postgraduate team.

Assessment Strategy

Knowledge and understanding are assessed through a range of methods including in-course reports, student presentations, critical appraisal of published works and conventional unseen examinations (for relevant self-selected knowledge module choices). Formative feedback is given for all in-course assessment. A1 is assessed by the preparation of a research project proposal including a literature review of the chosen field of study. A2 assessment depends on the chosen branch: students undertaking theoretical projects will be assessed by a conventional examination (15 credits) and several mini-projects on various theoretical/computational topics in physics (10 credits); students undertaking an experimental project will fabricate, test and analyse scientifically relevant samples and the assessment will be done through the preparation of two laboratory reports focussing on the learned techniques and samples used. A3 will be assessed via the preparation of a scientific journal article based on the raw data of a published article in addition to a student presentation critiquing a scientific article. A4 will be assessed via the dissertation.

Intellectual Skills

On completing the programme students should be able to:

B1 source and evaluate current research evidence in physics

B2 construct detailed, coherent, logical and critical arguments based on physical principles, by integrating information and synthesising knowledge.

B3 evaluate critically research objectives, methods and outcomes and contribute to the body of knowledge in physics research.

B4 solve advanced research-informed problems.

Teaching and Learning Methods

All of these skills are developed through the mixture of lectures, workshops, small group discussion and tutorials in semester 1 above and are further developed during the research project through active participation as a member of the research group where there are additional (less formal) activities including: regular research seminars, group meetings etc. Throughout the programme much emphasis is placed on independent study and guided reading. In-course work is assessed and formative feedback is given.

Assessment Strategy

Intellectual skills are assessed in two parts. First: along with knowledge and understanding where a range of methods are employed depending on the modules selected including: in-course scientific reports; student presentations; critical appraisal of published works and conventional unseen examinations. Second: there is further substantial assessment of the research project through a poster presentation, submitted dissertation and an oral presentation.

Practical Skills

On completing the programme students should be able to:

C1 identify practical and methodologically robust design solutions to selected research questions in physics.

C2 select and apply relevant characterisation tools and techniques and/or methodologies in an appropriate research setting

C3 identify key safety issues and procedures related to their own research project (relevant only to experimental stream).

C4 to apply advanced computing skills to project work through the use of appropriate computational tools and packages or through programming. (relevant only to theoretical stream).

Teaching and Learning Methods

Practical skills C1 – C4 are achieved largely during the research project. Work on the project leads to the practise and development of these skills. Project learning is informed by independent guided reading necessary for the production of a dissertation, poster presentation and oral presentation. Students receive tutorial guidance from their supervisors and feedback where relevant.

Assessment Strategy

These skills are assessed by the project supervisor who gives an independent mark for student's ability/application and effort; through an oral presentation; through a poster presentation; and through a 15-page journal-style dissertation, which is assessed by an additional internal examiner.

Transferable/Key Skills

On completing the programme students should be able to:
D1 Communicate complex information, ideas and project work concisely, accurately and effectively, to an appropriate standard for an academic/professional audience.
D2 Identify, select, access and critically evaluate relevant sources of information.
D3 Create, implement and monitor a plan, have the self-organisation to meet deadlines and project milestones.
D4 Interact constructively with other people, identifying who and how others may help in achieving aims and desired outcomes and put plans into action.
D5 work independently

Teaching and Learning Methods

These skills are developed through the requirement to carry out and produce written assignments for study modules and the research project. The course is deliberately designed in a way that requires students to address D1 to D5 throughout its duration. Feedback on all skills is given at all stages of the project via communication with peers during research group meetings, individual meetings with project supervisors and regular interactions with group members.

Assessment Strategy

These skills are summatively assessed through the written assignments and dissertation. D2 and D5 are not summatively assessed independently, although they are indirectly assessed through the successful production of written assignments and the dissertation.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

This broad-based research programme has a modular structure. Level 7 (Masters) academic credits are accrued for each module completed successfully. Students undertake 180 credits in total: 120 credits are assigned to the research project and 60 are taught modules. "Research Skills I: Scientific Methods" (20 credits) and "Research Skills II: Project Proposal" (15 credits) are compulsory for all students in the programme. Students will undertake a compulsory 10 credit module for their chosen stream, either "Computational Research Skills in Physics" for students on the theory stream, or "Laboratory Research Skills" for those on the experimental stream. Students can then choose one of the 15 credit subject knowledge modules based on the requirements of the chosen project.

Research Project: The research project is the largest single component of the degree programme at 120 credits. Projects are selected by students subject to supervisor availability with help and guidance as required. Projects run from January until September and includes one week to prepare the poster presentation and a three week period set aside for writing up the dissertation.

Key features of the programme (including what makes the programme distinctive)

The key features of this programme are the diversity of choice offered to students and the research-focused approach to learning.

The programme provides a wide choice of select areas of study to match students' individual needs. Students choose three from a wide choice of specialist, research-informed subject knowledge modules. For some programmes this selection must include one or more specific subject specialist modules.

Research projects are self-selected by the students and map to all areas of research excellence within Physics. Thus, projects offered on this course form part of on-going research programmes and students have an opportunity to experience cutting-edge research identified in their chosen area.

It may be possible to select alternative level 7 (Masters) modules offered in the University at the discretion of the Degree Programme Director.

Programme regulations (link to on-line version)

13 Support for Student Learning

Generic information regarding University provision is available at the following link.

Generic Information

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

Generic information regarding University provision is available at the following link.

Generic Information

Accreditation reports

Additional mechanisms

15 Regulation of assessment

Generic information regarding University provision is available at the following link.

Generic Information

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

The University Prospectus: http://www.ncl.ac.uk/undergraduate/degrees/#subject
Degree Programme and University Regulations: http://www.ncl.ac.uk/regulations/docs/

Please note. 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.