

PROGRAMME SPECIFICATION

| | | |
|----------|---------------------------------|--|
| 1 | Awarding Institution | Newcastle University |
| 2 | Teaching Institution | Newcastle University |
| 3 | Final Award | Master of Science |
| 4 | Programme Title | See item 5 |
| 5 | Programme Code | MSc in Clinical Science (Radiotherapy Physics) 5249P MSc in Clinical Science (Radiation Safety Physics) 5250P MSc in Clinical Science (Imaging with Ionising Radiation) 5251P MSc in Clinical Science (Imaging with Non-Ionising Radiation) 5252P CPD Clinical Science 6044P |
| 6 | Programme Accreditation | Department of Health/Medical Education England Healthcare Science Programme Board |
| 7 | QAA Subject Benchmark(s) | N/A |
| 8 | FHEQ Level | 7 |
| 9 | Last updated | October 2014 |

10 Programme Aims

To provide a career framework for healthcare science professionals by providing an education and training programme that is clear and coherent. This will enable the individual to enter a defined healthcare science career. The programme has been developed to meet workforce needs and will ensure flexibility, sustainability and modern career pathways for healthcare scientists, fit to address the needs of future NHS.

Modernising Scientific Careers: MSc in Clinical Science (Medical Physics) programme will offer an MSc in four specialisms namely:

- i. Radiotherapy Physics
- ii. Radiation Safety Physics
- iii. Imaging with Ionising Radiation
- iv. Imaging with Non-Ionising Radiation

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 have:

- A1** a systematic understanding of Medical Physics and a critical awareness of current problems and/or new insights at the forefront of their specialist area of professional practice;
A2 an in-depth understanding of the knowledge required to support each work-place specialism, specifically 'Radiotherapy Physics, Radiation Safety Physics, Imaging with Ionising Radiation & Imaging with Non-Ionising Radiation'.
A3 a systematic understanding of a substantial body of knowledge which is at the forefront of their specialist area of professional practice;

A4 a detailed understanding of applicable techniques for research and advanced academic enquiry.

Teaching and Learning Methods

A1–A4 are achieved by lectures, seminars and laboratory classes. **A2** will be supported initially by a intensive teaching programme of lectures, seminars and group based discussion at Newcastle. Subsequent to this, students will then undertake a series of work-based modules during their clinical rotations which will be supported later by further intensive teaching days, and through online learning / discussion boards, therefore enabling students to develop state of the art clinical knowledge and practical skills (see also **B1-B5** below). In the cases of **A1** and **A3**, lectures and seminars are also accompanied by practical sessions and visits to the clinical facilities in the local area (North East region). The teaching strategy for **A4** includes lectures to set out baseline knowledge, principles and standards, and small group discussions, group exercises and seminars where current knowledge and R&D outputs are presented and examined from a range of perspectives.

Students will acquire knowledge through team work, case studies, presentations, and independent study and research. Some modules include short problem solving exercises.

Assessment Strategy

Intended learning outcomes regarding knowledge and understanding are assessed based on coursework involving both written and oral communications at the individual or team level. This will include a variety of continuous forms of assessment including essays, problem-solving exercises, laboratory reports and case studies and both formative and summative assessments. The virtual learning environment, Blackboard, will be used for both formative and summative assessments. The examinations will be held in the traditional format with students attending the University.

Closed book examinations will be used as a complementary means of assessing factual knowledge.

Intellectual Skills

On completing the programme students should be able to:

- B1** synthesise key findings and knowledge from across the Clinical Science spectrum, in particular those relating to Medical Physics, to enhance patient outcomes and welfare
- B2** make informed judgements on complex issues in their specialist field, often in the absence of complete data, and communicate their ideas and conclusions directly clearly and effectively to specialist and non-specialist audiences including patients
- B3** undertake applied research and development at an advanced level, contributing substantially to the development of new techniques, ideas, or approaches in their specialist area.
- B4** critically evaluate the quality of data and information offered from different sources
- B5** demonstrate the general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of their specialist discipline and to adjust the project design in the light of unforeseen problems;

Teaching and Learning Methods

Intellectual skills (**B1-B5**) are developed progressively throughout the programme in modules containing seminars, case studies and as part of their work-based learning.

Throughout the programme, students will develop intellectual skills by participating in group discussions, case studies and in their workplace to enhance their **(a)** analytical and interpretative faculties and **(b)** ability to formulate objective and coherent arguments.

Work based Clinical Rotations and associated team problem solving exercises are the main method used to enhance intellectual skills related to applying best practice in research and in making judgements to enhance patient welfare and outcomes.

Design, execution, statistical analysis and reporting of the final dissertation project enhance the learning of these skills in a focused manner.

Assessment Strategy

B1 is assessed through individual and/or group preparation exercises and particularly through the case led problem based learning (C/PBL) write up.

B1 & B2 are assessed via oral presentations and assessed essays.

B1 & B2 are also assessed in certain optional modules by closed book examinations. The interactive learning environment, Blackboard, will be used for both formative and summative assessments.

B3 & B4 are assessed using a range of conventional scientific formats including: preparation of an abstract, a poster, a presentation and a dissertation. The project with all of these assessments tests a range of transferable skills.

B5 is assessed by the production of a project proposal, literature review and project dissertation.

Practical Skills

On completing the programme students should be able to:

C1 identify a wide range of analytical and clinical science methods across the Medical Physics discipline but specifically in their own elective specialisation.

C2 prepare and present information, in both written and verbal formats, to stakeholders (e.g. patients, clinical colleagues, other Healthcare Professionals and the public) with contrasting levels of knowledge and understanding

C3 assemble a body of data, analyse and critically evaluate the data and its source using appropriate statistical and qualitative techniques.

C4 work across an interdisciplinary team to maximise patient care and outcomes.

Teaching and Learning Methods

Practical Skills (**C1-C4**) are primarily obtained through coursework, clinical rotations, assignments and the research project.

C2 & C3 will be developed through specific components (data handling, statistical and research) which are included in all compulsory modules.

Assessment Strategy

The assessment of practical skills (**C1-C4**) will be based on **(a)** written assessment (including bibliographies) produced as part of essays, seminar presentations and the final project dissertation, **(b)** data handling and analyses carried out as part of problem solving exercises and the project dissertation and **(c)** presentations to their peer cohort, work place and University supervisors and other stakeholder groups.

Transferable/Key Skills

On completing the programme students should be able to:

D1 exercise initiative and personal responsibility

D2 make decisions in complex and unpredictable situations

D3 take responsibility for their own learning as is required for continuing professional development

D4 work effectively as a member of teams both subject specific and multi-disciplinary

D5 use effective time and resource management practices.

Teaching and Learning Methods

Transferable/Key skills **D1-D5** are developed throughout the programme through coursework, student led sessions, clinical visits, clinical rotations, final dissertation and workshops.

Assessment Strategy

Key skills **D1-D5** are indirectly assessed through formative coursework, team and individual presentations, research papers and the dissertation, including a supervisor's mark for the conduct of the project. Additional formative assessment comes through the workplace supervisor who is asked to comment on the student's progress during the clinical rotations related to modules MPY8001 and MPY 8005-12, as relevant to their specific study pathways, against key skills **D1-D5**.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

This programme is available as part time study comprising modules to a value of 180 credits, studied over 3 years.

A master's candidate shall study taught modules to a value of 120 credits and project modules to a value of 60 credits. All modules are core, credit information is detailed below.

| Module Code | Module Short Title | Total Cred |
|-------------|--|------------|
| MGS8002 | Research Skills-Health Care Professional | 10 |
| MPY8001 | Introduction to Medical Physics | 40 |
| MPY8005 | Radiotherapy Physics 1 | 20 |
| MPY8006 | Radiotherapy Physics 2 | 30 |
| MPY8007 | Radiation Safety Physics 1 | 20 |
| MPY8008 | Radiation Safety Physics 2 | 30 |
| MPY8009 | Imaging with Ionising Radiation 1 | 20 |
| MPY8010 | Imaging with Ionising Radiation 2 | 30 |
| MPY8011 | Imaging with Non Ionising Radiation 1 | 20 |
| MPY8012 | Imaging with Non Ionising Radiation 2 | 30 |
| MSC8001 | Introduction to Healthcare Science | 20 |
| MSC8003 | Research Project 1 | 30 |
| MSC8004 | Research Project 2 | 30 |

A group of "**common**" **core ("Generic") modules** will be delivered across all specialisms thus providing a common "backbone" to the curriculum.

Broad Framework of national *Modernising Scientific Careers* MSc in Clinical Science (Physiological Sciences) training:

| MSc Clinical Science Route Map for Medical Physics | | | | |
|--|--|--|-----------|--|
| | Year 1 | Year 2 | Year 3 | |
| | Introduction to Healthcare Science, Professional Practice and Clinical Leadership [20] | Research Methods [10] | | |
| | Introduction to Specialist Medical Physics: underpinning knowledge for rotational work based training [40] | | | |
| <p>Route map of MSc Clinical Science (Medical Physics) with specialisms in Radiotherapy Physics, Radiation Safety, Imaging with Ionising Radiation, Imaging with Non-Ionising Radiation. In Year 1, trainees begin by following the generic curriculum, which spans all divisions (blue), together with some division/theme-specific modules (yellow). In Year 2 and 3, trainees specialise (orange)</p> | | Radiotherapy Physics Radiotherapy 1 [20] Radiotherapy 2 [30] Research Project [30] Research Project [30] | | |
| | | OR | | |
| | | Radiation Safety Radiation Safety 1 [20] Radiation Safety 2 [30] Research Project [30] Research Project [30] | | |
| | | OR | | |
| | | Imaging with Ionising Radiation Imaging with Ionising Radiation 1 [20] Imaging with Ionising Radiation 2 [30] Research Project [30] Research Project [30] | | |
| | | OR | | |
| | | Imaging with Non-Ionising Radiation Imaging with Non-Ionising Radiation 1 [20] Imaging with Non-Ionising Radiation 2 [30] Research Project [30] Research Project [30] | | |
| | | | | |
| | | | | |
| | | | | |
| Credits | | | | |
| Generic | 20 | 10 | 0 | |
| Division/Theme | 40 | 0 | 0 | |
| Specialism | | 50 | 60 | |
| Total | 60 | 60 | 60 | |

Figure 2: High-Level Framework for MSc Clinical Science

| | | | |
|----------------------------|--|--|--|
| Year 3 Specialist Practice | Healthcare Science Specialist Learning with integrated Professional Practice [30] | | Research Project Students would usually begin a work based research project in Year 2 and complete the project in Year 3 [30] |
| | Specialism | | |
| Year 2 Specialist Practice | Research Methods [10] | Healthcare Science Specialist Learning with integrated Professional Practice [20] | Research Project Students would usually begin a work based research project in Year 2 and complete the project in Year 3 [30] |
| | Generic | Specialism | |
| Year 1 Core Modules | Healthcare Science Integrating science and Professional Practice [20] | | Healthcare Science Integrating underpinning knowledge required for each rotational element with Professional Practice [40] |
| | Generic | Division/Theme | |

- Generic Modules: Common to all divisions of healthcare science
- Division/Theme-Specific Modules: Common to a division or theme
- Specialist Modules: Specific to a specialism

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

The national healthcare scientist training programme is part of the wider changes that are taking place within healthcare science education and is designed to train the healthcare scientists of the future (*Modernising Scientific Careers*). Students will join this three-year part-time MSc in Clinical Science (Medical Physics) course as part of their full-time integrated training programme of work-based and academic learning. Trainees will be employed by an NHS Trust where they will be required to undertake a range of clinical rotations, working in different departments (and possibly different Trusts), before specialising in the last two years of training. After this period of training, successful trainees will be in a position to apply for NHS posts as healthcare scientists and to the appropriate professional register if applicable.

The academic programme is designed to provide an all round education in a number of selected areas of Medical Physics in a Healthcare Science setting. Teaching will involve a mixture of face-to-face learning and e-learning via Newcastle University's VLE Blackboard. Through this medium, students will be able to interact with other students from across the different themes covered in this programme. This will be continued throughout the programme stages; in year 2 the 'Research Methods' module (10 credits) discussion boards may also include students from a number of different disciplines including students taking the module as standalone CPD (e.g. Medical Registrars, Clinical Trial Managers, Research Nurses), creating an ethos of an inter-professional learning.

The programme has been designed so that in each year the students' specialism specific taught material is front loaded into the intensive teaching weeks (four weeks in year 1, one week in years 2 and 3). This will enable the student to absorb the knowledge required to prepare them for their clinical rotations and then latterly for their specialism specific role and enable them to work effectively through their work-based clinical rotations. This method of "knowledge loading" also supports the problem based learning approach and prepares them for their clinical rotations.

The students will have the benefit of accessing the expertise, learning and clinical facilities of Newcastle University as well as of clinical facilities at Newcastle upon Tyne Hospitals NHS Foundation Trust and other facilities in the North East region, and from experts in their field throughout the North East region.

The link between the theoretical underpinning provided by the academic input and the direct application of theory to practice in the workplace makes these programmes distinctive.

Programme regulations (link to on-line version)

<http://www.ncl.ac.uk/regulations/programme/>

13 Criteria for admission

Entry qualifications

A candidate may be entered at the discretion of the Degree Programme Director and provided that such a candidate:

- (a) has a minimum lower-second-class Honours degree, in an appropriate subject, or equivalent professional qualification in a profession allied to medicine with at least two years post-qualification experience; and
- (b) has secured a training place under the national *Modernising Scientific Careers* to ensure parallel clinical rotations to support the course outcomes.

Admissions policy/selection tools

Applicants will be nominated through the national Modernising Scientific Careers selection process.

Non-standard Entry Requirements: None

Additional Requirements: None

Level of English Language capability:
Overall IELTS score of 7.0, minimum 6.5 in each component.

14 Support for Student Learning

The Student Services portal provides links to key services and other information and is available at: <http://www.ncl.ac.uk/students/>

Induction

During the first week of the first semester students attend an induction programme. New students will be given a general introduction to University life and the University's principle support services and general information about the School and their programme, as described in the Degree Programme Handbook. New and continuing students will be given detailed programme information and the timetable of lectures/practicals/labs/ tutorials/etc. The International Office offers an additional induction programme for overseas students.

Study skills support

Students will learn a range of Personal Transferable Skills, including Study Skills, as outlined in the Programme Specification. Some of this material, e.g. time management is covered in the appropriate Induction Programme. Students are explicitly tutored on their approach to both group and individual projects.

Numeracy support is available through Maths Aid and help with academic writing is available from the Writing Development Centre (further information is available from the Robinson Library).

Academic and Pastoral support

Each undergraduate and taught postgraduate student will be assigned a personal tutor.* A personal tutor is one part of a wider network of advice and guidance available to students to support their personal and general academic development. The module leader acts as the first point of contact for subject-specific academic advice. Thereafter the Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Student-Staff Committee, and/or at the Board of Studies. Within the academic unit, students may also receive additional academic and pastoral advice from a range of other student-facing staff including degree programme directors, dissertation/project supervisors, and administrative support staff.

*Arrangements may vary for students taking special types of provision.

The University also offers a wide range of institutional services and support upon which students can call, such as the Writing Development Centre, Careers Service and Student Wellbeing Service. This includes one-to-one counselling and guidance or group sessions / workshops on a range of topics, such as emotional issues e.g. stress and anxiety, student finance and budgeting, disability matters etc. There is specialist support available for students with dyslexia and mental health issues. Furthermore, the Student Union operates a Student Advice Centre, which can provide advocacy and support to students on a range of topics including housing, debt, legal issues etc.

Support for students with disabilities

The University's Disability Support team provides help and advice for disabled students at the University - and those thinking of coming to Newcastle. It provides individuals with: advice about the University's facilities, services and the accessibility of campus; details about the technical support available; guidance in study skills and advice on financial support arrangements; a resources room with equipment and software to assist students in their studies.

Learning resources

The University's main learning resources are provided by the Robinson and Walton Libraries (for books, journals, online resources), and Information Systems and Services, which supports campus-wide computing facilities.

All new students whose first language is not English are required to take an English Language Proficiency Test. This is administered by INTO Newcastle University Centre on behalf of Newcastle University. Where appropriate, in-session language training can be provided. The INTO Newcastle University Centre houses a range of resources which may be particularly appropriate for those interested in an Erasmus exchange.

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

Module reviews

All modules are subject to review by questionnaires which are considered by the Board of Studies. Changes to, or the introduction of new, modules are considered at the Board of Studies and/or the School Teaching and Learning Committee. Student opinion is sought at the Student-Staff Committee and/or the Board of Studies. New modules and major changes to existing modules are subject to approval by the Faculty Learning, Teaching and Student Experience Committee.

Programme reviews

The Board of Studies conducts an Annual Monitoring and Review of the degree programme and reports to Faculty Learning, Teaching and Student Experience Committee. The FLTSEC takes an overview of all programmes within the Faculty and reports any Faculty or institutional issues to the Faculty Learning, Teaching and Student Experience Committee.

External Examiner reports

External Examiner reports are considered by the Board of Studies. The Board responds to these reports through Faculty Learning, Teaching and Student Experience Committee. External Examiner reports are shared with institutional student representatives, through the Student-Staff Committee.

Student evaluations

All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the Student-Staff Committee, and the Board of Studies. The results from student surveys are considered as part of the Annual Monitoring and Review of the programme and any arising actions are captured at programme and School / institutional level and reported to the appropriate body.

Mechanisms for gaining student feedback

Feedback is channelled via the Student-Staff Committee and the Board of Studies.

Faculty and University Review Mechanisms

Every six years degree programmes in each subject area undergo periodic review. This involves both the detailed consideration of a range of documentation, and a review visit by a review team (normally one day in duration) which includes an external subject specialist and a student representative. Following the review a report is produced, which forms the basis for a decision by University Learning, Teaching and Student Experience Committee on whether the programmes reviewed should be re-approved for a further six year period.

Accreditation reports

Every three years the programmes undergo a periodic review.

Additional mechanisms

Employer input will be established formally through a Programme/Employer Liaison Committee, allowing formal input by the employers (the host Trusts where the students are employed and through which their clinical rotations are organised). Additionally, employers will be encouraged to provide informal feedback, e.g. on the course to module leaders, or on issues relating to inter-relations between the academic course and the clinical rotations. Patient input will be sought on all aspects of the programme, including through patient representatives on all programme committees.

16 Regulation of assessment

Pass mark

The pass mark is 50%

Course requirements

Progression is subject to the University's Masters Degree Progress Regulations, Taught and Research and Examination Conventions for Taught Masters Degrees. There are reassessment opportunities, with certain restrictions. Limited compensation up to 40 credits of the taught element and down to a mark of 40% is possible for candidates who commenced their programme in 2013/14 or earlier. For students starting their programme in 2014/15 or later, no compensation is possible.

The University employs a common marking scheme, which is specified in the Taught Postgraduate Examination Conventions, namely:

Summary description applicable to postgraduate Masters programmes

| | |
|-------------|-----------------------|
| <50 | Fail |
| 50-59 | Pass |
| 60-69 | Pass with Merit |
| 70 or above | Pass with Distinction |

Summary description applicable to postgraduate Certificate and Diploma programmes

| | |
|-------------|------|
| <50 | Fail |
| 50 or above | Pass |

Role of the External Examiner

An External Examiner, a distinguished member of the subject community, is appointed by the University following recommendation from the Board of Studies. The External Examiner is expected to:

- i. See and approve assessment papers
- ii. Moderate examination and coursework marking
- iii. Attend the Board of Examiners
- iv. Report to the University on the standards of the programme

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

The University Prospectus: <http://www.ncl.ac.uk/postgraduate/>

The School Brochure: <http://www.ncl.ac.uk/marketing/services/print/publications/ordering/>

Degree Programme and University Regulations: <http://www.ncl.ac.uk/regulations/docs/>

The Degree Programme Handbook:

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

Mapping of Intended Learning Outcomes onto Curriculum/Modules

| Year 1 | MSc Clinical Science Specialisms – Medical Physics | | | | Intended Learning Outcomes | | | |
|---|--|------------------|---------------------------------|-------------------------------------|----------------------------|-----------|---------|-----------|
| | Radiotherapy Physics | Radiation Safety | Imaging with Ionising Radiation | Imaging with Non-Ionising Radiation | A | B | C | D |
| MSC8001: Introduction to Healthcare Science, Professional Practice and Clinical Leadership (20 Credits) | Compulsory | Compulsory | Compulsory | Compulsory | 1,3 | 1,4 | 2,4 | 1,2,3,4,5 |
| MPY8001: Introduction to Medical Physics | Compulsory | Compulsory | Compulsory | Compulsory | 1,2,3 | 1,4 | 2,4 | 1,2,4,5 |
| MCR8201: Research Skills for Health Care Professionals (10 Credits) | Compulsory | Compulsory | Compulsory | Compulsory | 3,4 | 5 | 2,4 | 1,3,4,5 |
| Year 2 | | | | | | | | |
| MGS8002: Research Skills for Health Care Professionals (10 Credits) | Compulsory | Compulsory | Compulsory | Compulsory | 3,4 | 5 | 2,4 | 1,3,4,5 |
| MSC8003: Research Project 1 (30 Credits) | Compulsory | Compulsory | Compulsory | Compulsory | 1,3,4 | 3,4,5 | 2,3,4 | 1,3,4,5 |
| MPY8005 Radiotherapy Physics 1 (20 credits) | Compulsory | | | | 1,2,3,4, | 1,2,4 | 1,2,4 | 1,2,3,4,5 |
| MPY8007 Radiation Safety Physics 1 (20 credits) | | Compulsory | | | 1,2,3,4 | 1,2,4 | 1,2,4 | 1,2,3,4,5 |
| MPY8009 Imaging with Ionising Radiation 1 (20 credits) | | | Compulsory | | 1,2,3,4 | 1,2,4 | 1,2,4 | 1,2,3,4,5 |
| MPY8011 Imaging with Non- Ionising Radiation 1 (20 credits) | | | | Compulsory | 1,2,3,4 | 1,2,4 | 1,2,4 | 1,2,3,4,5 |
| Year 3 | | | | | | | | |
| MSC8004: Research Project 2 (30 Credits) | Compulsory | Compulsory | Compulsory | Compulsory | 1,3,4 | 3,4,5 | 2,3,4 | 1,3,4,5 |
| MPY8006 Radiotherapy Physics 2 (30 credits) | | | | | 1,3,4 | 1,2,3,4,5 | 1,2,3,4 | 1,2,3,4,5 |
| MPY8008 Radiation Safety Physics 2 (30 credits) | | | | | 1,3,4 | 1,2,3,4,5 | 1,2,3,4 | 1,2,3,4,5 |
| MPY8010 Imaging with Ionising Radiation 2 (30 Credits) | | | | | 1,3,4 | 1,2,3,4,5 | 1,2,3,4 | 1,2,3,4,5 |
| MPY8012 Imaging with Non- Ionising Radiation 2 (30 Credits) | | | | | 1,3,4 | 1,2,3,4,5 | 1,2,3,4 | 1,2,3,4,5 |