

Programme Specification

Title of programme: MSc Genomic Medicine

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided.

Awarding Institution	University of Southampton
Teaching Institution	University of Southampton
Accreditation details	University of Southampton
Final award	Master's Degree
Name of award	Genomic Medicine
Interim Exit awards	Postgraduate Diploma in Genomic Medicine / Postgraduate Certificate in Genomic Medicine/ Postgraduate Certificate in the Principles of Genomic Medicine.
FHEQ level of final award	7
UCAS code	n/a
QAA Subject Benchmark or other external reference	QAA Educational Outcomes Framework HEE Commission for MSc programme in Genomic Medicine Liberating the NHS: Developing the Healthcare Workforce - from design to delivery (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216421/dh_132087.pdf).
Programme Lead	Deborah Mackay
Date specification was written	December 2014 - May 2015
Date Programme was validated	June 2015

Programme Overview

Brief outline of the programme

This Master of Science (MSc) programme in Genomic Medicine has been commissioned by NHS England / Health Education England to provide education and training in genomics for health professionals from different professional backgrounds (e.g. medicine, nursing, public health, science and technology), for whom knowledge of genomics will impact on their service delivery to patients and the public. The aim of the degree is to provide a multi-disciplinary and multi-professional perspective in genomics, applied to clinical practice and medical research, to enhance knowledge and skills in this rapidly evolving field. In particular, graduates of the programme will be equipped to harness the unprecedented transformation of the 100,000 Genomes Project, bring benefit to their patients through improved diagnosis and personalised treatment, and disseminate knowledge to peers, patients and the public.

Learning and teaching

The programme will have a modular structure and use blended learning formats, delivered flexibly in full-time or part-time options, or as individual or grouped modules, to facilitate access from as wide as possible a range of healthcare professionals.

Each taught module (with the exception of Health Economics and Clinical Research Skills) will include two groups of two days' intensive face-to-face teaching interspersed with independent study. Additionally, the first core module will include an additional day of student contact to include an induction to the University's facilities and introduction to basic research skills (literature searching, critical appraisal of scientific literature). During the on-site teaching, a variety of learning and teaching methods will be adopted to promote a wide range of skills and meet the differing learning styles of the group, including seminars, group work, practical demonstrations and exercises surrounding interpretation of data and clinical scenarios. Specialist teaching from a range of academic and health care professional backgrounds will be used to ensure a breadth and depth of perspective is offered, giving a good balance between background theories and principles and practical advice. Independent study will be delivered through a virtual learning environment (VLE) operating effectively as an online campus, delivering a library of study materials including uploaded lectures, virtual patients and independent learning tasks, reference materials, links to online tutorials, student fora, and guest lectures with webchats.

Assessment

The progress of students will be assessed by a variety of tasks designed (i) to reflect the learning outcomes of different modules, (ii) to play to the varying strengths of the student cohort, and (iii) make their learning 'fit

for purpose'. Assessments will include short and extended assignments, multi-choice and short-answer questions, oral and poster presentations, research proposals, virtual patient tasks and analytical manipulations of genomic datasets.

As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration, however, any revision will be balanced against the requirement that the student should receive the educational service expected. Please read our [Disclaimer](#) to see why, when and how changes may be made to a student's programme.

Educational Aims of the Programme

The aims of the programme are to:

- Enhance your educational and professional expertise in all core areas of genomics, giving you knowledge, understanding and professional skills to improve your practice.
- Evaluate the psychological impact of living with genetic disease so that through empathy, the diagnosis, management and the lives of patients and their families can be improved.
- Develop your approach to solving problems, building on a logical and hierarchical approach that allows you to justify personal and professional decisions through critical evaluation and synthesis of relevant theories, empirical evidence and experience to optimise your professional practice.
- Enable you to demonstrate leadership in clinical use of genomics, and disseminate knowledge and skill to your peers and colleagues, your patients and the public.
- Develop your ability to integrate research evidence into all aspects of decision making and to apply knowledge, analytical and critical thinking skills to make sound judgements about the application of genomic findings to the care of your patients.
- Apply an evidence-based approach to critically evaluate the current literature, and develop the skills needed to successfully complete research project.
- Develop strategies for your continuing professional development and lifelong learning.

Programme Learning Outcomes

The programme provides opportunities for you to develop and demonstrate your knowledge and understanding, skills and other attributes in the following areas:

Knowledge and Understanding

Having successfully completed this programme you will be able to demonstrate knowledge and understanding (*mapping to the core modules 1-8*) of:

- 1.1 The structure and variations in genetic material; role of genetics in disease and use of genomic information to elucidate disease mechanisms and biology.
- 1.2 The application of 'omics' technologies to cancer, inherited and infectious diseases, as the 100,000 Genomes Project.
- 1.3 Clinical presentations of rare inherited and common diseases and the traditional and current strategies for identifying genes responsible
- 1.4 Molecular mechanisms of cancer development; germline/tumour comparison in diagnosis and treatment.
- 1.5 Pharmacogenomics: the effect of genetics on medication response
- 1.6 The use of genomics in diagnosis, monitoring and control of infectious disease
- 1.7 Bioinformatics in clinical genomics; data resources, software, in silico tools, databases and literature
- 1.8 The design, execution and interpretation of an original piece of research

Teaching and Learning Methods

To help you develop your knowledge and understanding of genomics you will be exposed to a variety of methods of teaching and learning.

- The basic biology of the genome and its disruption in disease will be acquired through lectures, group work, peer teaching, guided e-learning, problem-solving approaches and coursework.
- Current and emerging approaches to genomic diagnosis in inherited, acquired and infectious disease, are learned through a combination of lectures, small group tutorials and workshops.
- Knowledge of personalised medicine, stratified medicine and pharmacogenomics is acquired through a combination of lectures, scenarios and virtual patient tasks.
- Handling of genomic data will be taught through intensive supported workshops tailored to the skills of individual students and underpinned by extensive e-learning resources.
- Innovative and relevant materials to aid self-directed learning on the application of acquired knowledge are also provided through guided e-learning materials. Additional support is provided by direct access to tutors as required (either by e-mail or personal communication).

- Understanding research methods and translating them to patient care is threaded right through the course, through interactive tutorials and group work, observation of research teams, critique of current research and discussion of established and emerging protocols during both on-site and distance forums. It is explicitly applied by the planning and execution of a research project, which may be either a dissertation or an independent literature review.

Assessment methods

Your knowledge and understanding will be tested through a combination of formative and summative assessments that may include essays and other written assignments, multiple choice questions, data handling, questions and answers, oral and poster presentations and virtual patient tasks.

Subject Specific Intellectual and Research Skills

Having successfully completed this programme you will be able to:

- 2.1 Apply analytical and synthetic skills to investigate and test new hypotheses;
- 2.2 Integrate information from a variety of sources to construct a coherent thesis on a scientific topic;
- 2.3 Critically evaluate the published literature with respect to the patient and carer perspective of genomic medicine;
- 2.4 Construct hypotheses pertinent to the experimental exploration of topical questions in the field of medical genomics;
- 2.5 Evaluate the significance of experimental results in the context of previous work;
- 2.6 Precis and disseminate information including test results in oral and written forms to colleagues, patients and the public.

Teaching and Learning Methods

To help you develop your intellectual and research skills you will be exposed to a variety of methods of teaching and learning. Seminars, tutorials, discussions and problem-solving approaches will be used in addition to formal lectures. Each module involves discussion of key issues and practice in applying concepts, both orally and in writing, including analysis and interpretation of material and feedback on work produced. All students will receive initial guidance on how to identify, locate and use the material available, including published articles and books, online repositories, and patient genomic data. Comprehensive bibliographies are provided for each topic at the outset and guidelines are provided for the production of written assignments. Group tuition is given in the application and interpretation of diagnostic tests in genomics, and their application to patient care.

Assessment methods

The variety of assessment methods employed all emphasize the requirement for you to demonstrate your skills through the production of written and oral responses to problems or set tasks in a way that is both coherent and fit-for-purpose. In common with all students in the Faculty, during your studies you will produce written assignments, carry out data handling work, give oral presentations and write a research project which will integrate your skills.

Transferable and Generic Skills

Having successfully completed this programme you will be able to:

- 3.1 Critically appraise and analyse scientific literature, and judge and interpret findings;
- 3.2 Show initiative and personal responsibility;
- 3.3 Make decisions in complex and unpredictable situations;
- 3.4 Learn independently as part of a commitment to continuing professional development;
- 3.5 Engage and communicate effectively with lay, clinical and research communities.

Teaching and Learning Methods

To help you develop your general skills you will be exposed to a range of teaching and learning methods that will develop your analytical and critical faculties, scientific judgement and interpretative independence, and enhance your written and oral communication skills.

Assessment methods

Your generic skills will be assessed throughout the programme.

Programme Structure

Typical course content

The programme can be tailored to meet the career aspirations of students, and enables you to choose your module options, plan your programme route, and choose from October or March commencements in your studies. You can choose to study part-time, or to undertake smaller numbers of or even individual modules,

in order to fit your study pragmatically around your other commitments. All students will enrol on the Masters programme, with the following early exit points available: Postgraduate Diploma in Genomic Medicine (60 ECTS), Postgraduate Certificate in Genomic Medicine/ Postgraduate Certificate in the Principles of Genomic Medicine (30 ECTS).

The MSc programme comprises eight core modules: seven taught modules of 7.5 ECTS each and either a 30 ECTS dissertation or 15 ECTS independent literature review. A range of optional modules is available to enable you to design your own learning experience to complement your career needs, and to complete the full programme of 90 ECTS.

Core modules 1 and 2 are taught twice annually, beginning in October and April. They are the background to all further studies, since they give a comprehensive scientific and clinical foundation to the normal structure of the genome, its alterations in disease, the current and emerging technologies in medical genomics and the NHS structures in which they are employed.

The core modules are as follows:

1. Introduction to Human Genetics and Genomics
2. Omics techniques and their application to Genomic Medicine
- 3: Genomics of common and rare inherited diseases;
- 4: Molecular pathology of cancer and application in cancer diagnosis, screening, and treatment;
- 5: Pharmacogenomics and stratified healthcare;
- 6: Application of genomics in infectious disease;
- 7: Bioinformatics, interpretation, and data quality assurance in genome analysis;

AND

8a: Dissertation (30 ECTS).

OR

8b: Independent Literature review (15 ECTS)

For a Masters degree, if 8a is chosen, the 30 ECTS dissertation and core modules will be accompanied by **one** optional module. If 8b is chosen, the 15 ECTS independent literature review and core modules must be accompanied by the workplace-based learning module along with 2 other optional modules. (This, taken together with the bioinformatics core module, which includes the manipulation of research data from the GeCIPs, meets the University guidance that “programmes such as the MA and MSc should conform to a structure whereby 60 ECTS are derived from the taught element of the programme and 30 ECTS are derived from the dissertation/project/exhibition/independent study element of the programme”).

The optional modules available are as follows:

- 9: Ethical, legal and social issues in applied genomics;
- 10: Counselling skills for genomics;
- 11: Health Economics;
- 12: Workplace-based learning;
- 13: Clinical research skills.

Each taught module (with the exception of Health Economics and Clinical Research Skills) will comprise two groups of two days' intensive face-to-face teaching, each followed by 2-4 weeks for independent study and assessment tasks. Independent study will be delivered through a virtual learning environment (VLE) operating effectively as an online campus, delivering a library of study materials including uploaded lectures, virtual patients and independent learning tasks, reference materials, links to online tutorials, student fora, and guest lectures with webchats. This will allow you to continue your investigation in your own home and/or work environments when producing your course work. We encourage students to contact us whenever support or guidance is needed.

Special Features of the programme

The modules will be taught by a faculty at the forefront of their respective academic disciplines and professions. Adult learning methods will be used throughout and an emphasis placed upon interactive learning, practical demonstration and the interpretation of clinical scenarios to reinforce learning.

Programme details

All students are entered on the MSc in Genomic Medicine.

Award	Core modules (all 7.5 ECTS except where specified)	Option modules (all 7.5 ECTS except where specified)
Master of Science in Genomic Medicine (90 ECTS) Classified	Human Genetics and Genomics Omics techniques in Genomic Medicine Genomics of common and rare inherited diseases Molecular pathology of cancer and application in cancer diagnosis, screening and treatment Pharmacogenomics and stratified healthcare	ELSI in applied genomics Counselling skills for genomics Health Economics (5 ECTS) Workplace-based

Application of genomics in infectious disease Bioinformatics, interpretation, data quality assurance in genome analysis	learning Clinical research skills (10 ECTS) Option level 7 module of students choice (10 ECTS)
Dissertation 30 ECTS Independent Literature Review 15 ECTS, which MUST be taken in combination with Workplace-based learning 7.5 ECTS	

This is a modular postgraduate programme that we would expect to be completed within 12 months full-time or 2 years of part-time study (this length of time will allow students to study alongside their other commitments), leading to 90 ECTS (European Credit Transfer System) at HE7 level. Completion of the MSc over a longer period of time is possible but may have funding implications.

The programme is arranged as 7 taught core modules, a dissertation or literature review, and a selection of optional modules. Each taught module is equivalent to 7.5 ECTS (or 150 hours of student learning and endeavour, including lectures, class presentations, class practical sessions, tutorials and independent study. Normally each student will attend the University for two blocks of teaching totalling 4 days per 7.5 ECTS module. The independent aspect of programme comprises a dissertation (30 ECTS or 600 hours) or an independent literature review (15 ECTS or 300 hours, which for a Masters degree must be accompanied by the Workplace-based learning module). It is recommended that the dissertation or literature review should not begin before completion of at least taught modules 1 and 2. One level 7 optional module may be chosen by the student, with prior agreement by the Programme Leader, from modules available across the University. The award at the end of the programme of study will be the degree of Master of Science, which is classified (pass, merit, distinction).

Progression Requirements

The programme follows the University's regulations for [Progression, Determination and Classification of Results: Undergraduate and Integrated Masters Programmes](#) as set out in the University Calendar.

Intermediate exit points (where available)

Exit Awards for MSc Genomic Medicine:

Postgraduate Diploma in Genomic Medicine (60 ECTS)

Postgraduate Certificate in Genomic Medicine (30 ECTS)

Postgraduate Certificate in the Principles of Genomic Medicine (30 ECTS)

You will be eligible for an interim exit award if you complete part of the programme but not all of it, as follows:

Qualification	Minimum overall credit in ECTS	Core Modules (all 7.5 ECTS except where stated)	Optional modules (all 7.5 ECTS except where stated)
Postgraduate Diploma in Genomic Medicine	60 ECTS	Human Genetics and Genomics Omics techniques in Genomic Medicine	Genomics of common and rare inherited diseases Molecular pathology of cancer and application in cancer diagnosis, screening and treatment Pharmacogenomics and stratified healthcare Application of genomics in infectious disease Bioinformatics, interpretation, data quality assurance in genome analysis ELSI in applied genomics Counselling skills for genomics Health Economics (5 ECTS) Workplace-based learning Clinical research skills (10 ECTS) Independent literature review (15 ECTS) Option level 7 module of student's choice (10 ECTS)
Postgraduate Certificate in Genomic Medicine	30 ECTS	Human Genetics and Genomics Omics techniques in Genomic Medicine	Genomics of common and rare inherited diseases Molecular pathology of cancer and application in cancer diagnosis,

			screening and treatment Pharmacogenomics and stratified healthcare Application of genomics in infectious disease Bioinformatics, interpretation, data quality assurance in genome analysis ELSI in applied genomics Counselling skills for genomics Workplace-based learning Independent literature review (15 ECTS) Health Economics (5 ECTS) OR Clinical research skills (10 ECTS)
Postgraduate Certificate in the Principles of Genomic Medicine	30 ECTS	Human Genetics and Genomics Omics techniques in Genomic Medicine	Health Economics (5 ECTS) Clinical research skills (10 ECTS) Option level 7 module of student's choice (10 ECTS)

Support for student learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular Faculty or discipline area.

The University provides:

- library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources
- high speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations.
- computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources)
- standard ICT tools such as Email, secure filestore and calendars.
- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- IT support through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the University Library, Highfield Campus
- Enabling Services offering support services and resources via a triage model to access crisis management, mental health support, and counselling
- Assessment and support (including specialist IT support) facilities if you have a disability, long term health problem or Specific Learning Difficulty (e.g. dyslexia)
- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards
- Career Destinations, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV
- a Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers
- Other support that includes health services, chaplaincy (for all faiths), and 'out of hours' support for students in Halls (18.00 – 08.00).

The Students' Union provides

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students' views to the University.
- opportunities for extracurricular activities and volunteering

- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- Support for student peer-to-peer groups, such as Nightline.

Associated with your programme you will be able to access:

- A welcome session for orientation and programme overview.
- Student module guides and timetables.
- An introduction to the library, reference management and Information Technology services (IT).
- Extensive library and other learning resources and facilities within the Faculty and University.
- The Programme Leader.
- The Module Leaders who are academic members of staff, who will be responsible for overseeing your progress throughout the module.
- The Faculty Senior Tutor for all pastoral matters.
- The International Officer.
- In consultation with the Module Leader you will identify or will be allocated with a local supervisor and / or a University supervisor. Dissertation projects will always have both a local supervisor and University supervisor, but independent literature review projects may have only a University supervisor.
- Personal access to academic staff, administrative staff and the Programme Leader.
- Access to the Southampton Virtual Environment, and Lyceum Linux Teaching Cluster Service (<http://www.southampton.ac.uk/isolutions/computing/hpc/compute/>)
- A personal academic tutor (PAT)
- A student representative

Methods for evaluating the quality of teaching and learning

You will have the opportunity to have your say on the quality of the programme in the following ways:

- Completing student evaluation questionnaires for each module of the programme
- Acting as a student representative on various committees, e.g. Staff: Student Liaison Committees, Faculty Programmes Committee OR providing comments to your student representative to feedback on your behalf.
- Serving as a student representative on Faculty Scrutiny Groups for programme validation
- Taking part in programme validation meetings by joining a panel of students to meet with the Faculty Scrutiny Group

The ways in which the quality of your programme is checked, both inside and outside the University, are:

- Regular module and programme reports which are monitored by the Faculty
- Programme validation, normally every five years.
- External examiners, who produce an annual report
- A national Research Assessment Exercise (our research activity contributes directly to the quality of your learning experience)
- Institutional Review by the Quality Assurance Agency
- Ongoing review of the development of Genomic Medicine services
- Faculty Programmes Committee

Criteria for admission

University Commitment

The University will at all times seek to operate admissions regulations that are fair and are in accordance with the law of the United Kingdom, and the University's Charter, Statutes, Ordinances and Regulations.

This includes specific compliance with legislation relating to discrimination (e.g. Equality Act 2010) and the University's Equal Opportunities Policy Statement.

This includes a commitment that the University will:

- actively assist groups that experience disadvantage in education and employment to benefit from belonging to the University
- actively seek to widen participation to enable students that do not traditionally participate in Higher Education to do so;
- ensure that admission procedures select students fairly and appropriately according to their academic ability and that the procedure is monitored and regularly reviewed.

Entry Requirements

You must satisfy the Regulations for Admission to Degree Courses as specified in Section IV: General Regulations of the University Calendar. In addition, the normal requirement for entry is a good first degree (at least second class), or equivalent qualification of an approved university in a health- or health-related field.

If you do not have a good first degree (second class) you may nonetheless be admitted to a programme. You will be expected to provide evidence that you are able to study at HE7 and satisfy the Programme Leader that you are competent to pursue the course of study proposed. Evidence of the ability to study at HE7 will normally be in the form of (i) a relevant professional qualification at a suitable level, (ii) several years' relevant post-qualifying professional experience, at least some of which must be at a responsible level, or (iii) completion of at least three years of an undergraduate medical degree.

The course is taught entirely in English. The Faculty of Medicine requires an IELTS score of 7.0 or equivalent (TOEFL offer a computer or internet based assessment). Those for whom English is not their first language are asked to indicate what level of English they have attained.

As part of the application process, candidates are asked to write a personal statement to explain their motivation for wishing to take the course and to indicate their future career plans.

Academic references will also be taken up.

University Admissions links:

<http://www.calendar.soton.ac.uk/sectionIV/admissions.html>

<http://www.calendar.soton.ac.uk/sectionXI/sectXI-index.html>

Career Opportunities

This postgraduate programme is designed to help you offer better care to your patients and the public; we provide health professionals with effective education and training to use medical genomics in the diagnosis, treatment and management of inherited, acquired and infectious disease, so that the lives of patients and their families can be improved.

Through the knowledge and understanding you will gain with us, you will develop and improve your health care provision, through your own continuing professional development and your ability to cascade education to your colleagues, adult and paediatric patients and their families, and the public.

External Examiners(s) for the programme

Name	Eamonn Shreidan
Institution	University of Leeds

Students must not contact External Examiner(s) directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff: Student Liaison Committee in the first instance, and Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality assurance process.

External examiners do not have a direct role in determining results for individual students, and students wishing to discuss their own performance in assessment should contact their personal tutor in the first instance.

Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. More detailed information can be found in the BlackBoard Virtual Learning Environment (www.blackboard.soton.ac.uk).

Appendix: Learning outcomes and Assessment Mapping

Programme Learning Outcomes aligned to Awards

Award	Knowledge and Understanding								Subject Specific Intellectual Skills						Transferable/Key Skills				
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	3.5
MSc Genomic Medicine	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PG Diploma Genomic Medicine	✓	✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PG Certificate Genomic Medicine	✓	✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PG Certificate Principles of Genomic medicine	✓	✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Programme Learning outcomes aligned to Programme Modules

MSc in Genomic Medicine

Module Code	Knowledge and Understanding								Subject Specific Intellectual Skills						Transferable/Key Skills				
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	3.5
Core modules																			
1	✓		✓				✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓		✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓			✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓			✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8a	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8b	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Optional modules																			
9	✓						✓	✓						✓	✓	✓	✓	✓	✓
10	✓													✓	✓	✓	✓	✓	✓
11											✓	✓		✓	✓	✓	✓	✓	✓
12							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓

Postgraduate Diploma in Genomic Medicine

Module Code	Knowledge and Understanding					Subject Specific Intellectual Skills						Transferable/Key Skills					
	1.1	1.2	1.3	1.4	1.7	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	3.5	
Compulsory modules (15 ECTS in total)																	
1	✓		✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Module options to total 45 ECTS																	
3	✓	✓	✓		✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
4	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
5	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
6	✓	✓			✓	✓		✓	✓			✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓		✓	✓
8b	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓
9	✓					✓					✓	✓	✓	✓	✓	✓	✓
10	✓										✓	✓	✓	✓	✓	✓	✓
11								✓	✓		✓	✓	✓	✓	✓	✓	✓
12						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	✓					✓	✓	✓	✓	✓	✓	✓	✓			✓	✓

Postgraduate Certificate in Genomic Medicine

Module Code	Knowledge and Understanding					Subject Specific Intellectual Skills						Transferable/Key Skills				
	1.1	1.2	1.3	1.4	1.7	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	3.5
Compulsory modules (15 ECTS in total)																
1	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Module options to total 15 ECTS																
3	✓	✓	✓		✓	✓	✓	✓	✓		✓		✓	✓	✓	✓
4	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
5	✓	✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
6	✓	✓			✓	✓		✓	✓			✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓	
8b	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓
9	✓					✓					✓	✓	✓	✓	✓	✓
10	✓										✓	✓	✓	✓	✓	✓
11								✓	✓		✓	✓	✓	✓	✓	
12						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	✓					✓	✓	✓	✓	✓		✓			✓	

Postgraduate Certificate in the principles of Genomic Medicine

Module Code	Knowledge and Understanding					Subject Specific Intellectual Skills						Transferable/Key Skills				
	1.1	1.2	1.3	1.4	1.7	2.1	2.2	2.3	2.4	2.5	2.6	3.1	3.2	3.3	3.4	3.5
Compulsory modules (15 ECTS in total)																
1	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
Module options to total 15 ECTS																
11								✓	✓		✓	✓	✓	✓	✓	
13	✓					✓	✓	✓	✓	✓		✓			✓	

Programme Modules

Core modules:

1. Introduction to Human Genetics and Genomics
2. Omics techniques and their application to Genomic Medicine
- 3: Genomics of common and rare inherited diseases
- 4: Molecular pathology of cancer and application in cancer diagnosis, screening, and treatment
- 5: Pharmacogenomics and stratified healthcare
- 6: Application of genomics in infectious disease
- 7: Bioinformatics, interpretation, and data quality assurance in genome analysis
- 8a: Dissertation
- 8b: Independent literature review

Optional modules:

- 9: Ethical, legal and social issues in applied genomics
- 10: Counselling skills for genomics
- 11: Health Economics MEDI6100
- 12: Workplace-based learning
- 13: Clinical research skills MEDI6048

Learning outcomes

Knowledge and understanding:

- 1.1 Structure and variations in genetic material; role of genetics in disease and use of genomic information to elucidate disease mechanisms and biology.
- 1.2 Application of 'omics' technologies to cancer, inherited and infectious diseases, as the 100,000 Genomes Project.
- 1.3 Clinical presentation of rare inherited and common diseases; traditional and current strategies for identifying genes responsible
- 1.4 Molecular mechanisms of cancer development; germline/tumour comparison in diagnosis and treatment.
- 1.5 Pharmacogenomics: the effect of genetics on medication response
- 1.6 Genomics in diagnosis, monitoring and control of infectious disease
- 1.7 Bioinformatics in clinical genomics; data resources, software, in silico tools, databases and literature
- 1.8 Use of course experience to design, prosecute and interpret an original piece of research or review of the literature

Subject-Specific Intellectual and Research Skills:

- 2.1 Application of analytical and synthetic skills to investigate and test new hypotheses
- 2.2 Integration of information from a variety of sources to construct a coherent thesis on a scientific topic

2.3 Critical evaluation of the published literature with respect to the patient and carer perspective of genomic medicine

2.4 Construction of hypotheses pertinent to the experimental exploration of topical questions in the field of medical genomics

2.5 Evaluation of the significance of experimental results in the context of previous work

2.6 Précis and dissemination of information including test results in oral and written forms to colleagues, patients and the public

Transferable and Generic Skills

3.1 Critical appraisal and analysis of scientific literature and the ability to judge and interpret findings

3.2 Initiative and personal responsibility

3.3 Decision-making in complex and unpredictable situations

3.4 Independent learning as part of a commitment to continuing professional development

3.5 Effective engagement and communication with lay, clinical and research communities

Assessments:

Module Code	Module Title	Assessment 1	Assessment 2	Assessment 3	Assessment 4	Assesment 5
1	Introduction to Human Genetics and Genomics (IHGG)	Written assignment - (1000 words) 50%	Short notes questions (Up to 12 questions) 50%	-		
2	Omics techniques and their application to Genomic Medicine	MCQ (2 hours) 50%	Scenario-based planning exercise with 10 min presentation 50%	-		
3	Genomics of common and rare inherited diseases	Written examination - MCQ and short notes (1.5 Hours) 50%	Written examination - MCQ and short notes (1.5 Hours) 50%	-		
4	Molecular pathology of cancer and application in cancer diagnosis, screening, and treatment	Written examination (1.5 hours) 50%	Written assignment (1500 words) 50%	-		
5	Pharmacogenomics and stratified healthcare	Virtual patient tasks including multiple choice questions (2 hours) 50%	2x Short critical review (2x 1000 words) 50%	-		
6	Application of genomics in infectious disease	Written assignment (1500 words) 50%	Written assignment (1500 words) 50%	-		
7	Bioinformatics, interpretation, and data quality assurance in genome analysis	Written report (1500 words) 75%	Written report (500 word letter) 25%	-		
8a	Dissertation 30 ECTS	Project plan (2000 words) 20%	Half way report (1000 words) Formative	Synopsis (300 words) Formative	Final Written Report (6000 words) 70%	Poster Presentation (1000 words) 10%
8b	Independent literature review	Project plan (1000 words) formative	Final written report (5000 words) 90%	Presentation of findings (1000 words) 10%		
9	Ethical, legal and social issues in applied genomics	Oral presentation (30 min) Satisfactory	Written assignment (3000 words) 100%	-		

		completion				
10	Counselling skills for genomics	Oral case presentation (case study) (15 min) 40%	Written assignment (2000 words) 60%	-		
11	Health Economics MEDI6100	Written assignment (2000 words) 100%	-	-		
12	Workplace-based learning	Clinical case reports (2400 words total) 70%	Work-based learning task & reflection (1200 word) 30%	-		
13	Clinical research skills MEDI6048	MCQ Examination 30%	Data Management. Analysis and reporting (up to 7 structured questions) 30%	Research Proposal 40%		