PG Dip in Materials Science for Innovative Engineering

Programme specification

School of Mathematics and Physics
Queen's University Belfast

Overview

Programme title	Postgraduate Diploma in Materials Science for Innovative Engineering
Programme code	TBC
Final award	PGDip
Awarding institution	Queen's University Belfast
Teaching institution	Queen's University Belfast
UCAS code	TBC
QAA Benchmarking Group	Materials

Educational aims of programme

On completion of the programme the student will be able to:

- understand the principal facts, theories and characterisation methods associated with materials science.
- independently critically evaluate written information in specialist areas of materials science.
- be self-directed and act autonomously in planning and implementing tasks at a professional level.
- be capable of presenting work in written form at a professional level.
- be directly employable in a considerable range of careers within materials based industries, or if already employed within industry have developed capability and knowledge that will enhance work performance.

Criteria for admission to programme

For current general university entry requirements for this pathway see http://www.qub.ac.uk/ado

Prior qualifications

Minimum entry requirement will normally be a 2(ii) UK honours-equivalent first degree in:

- Physics
- Chemistry
- Engineering
- or a related discipline.

Applicants with non-standard qualifications will be considered on an individual basis, based on the recognition of prior learning.

International Applicants

International applicants, or applicants who have not completed their primary or higher degree at an institution where the language of instruction and of assessment is English, will require an IELTS test with an overall score of 6.0 and a minimum of 5.5 in each of the four test components (taken within the past two years), or an alternative English Language qualification acceptable to the University. Non-EEA nationals must also meet UK visa requirements. For details of alternative qualifications which may be acceptable for both University and immigration purposes, please see http://go.qub.ac.uk/EnglishLanguageReqs

The English language qualifications of applicants with extensive work experience in an English speaking environment will be considered on an individual basis.

Additional relevant information

The programme is subject to the University General Regulations which can be found at:

http://www.qub.ac.uk/directorates/AcademicStudentAffairs/AcademicAffairs/

Further information can also be obtained from the student handbook.

For further information refer to

Further information about the programme is available from the School's website http://www.qub.ac.uk/schools/SchoolofMathematicsandPhysics/ and from the Programme Coordinator Dr Solveig Felton, s.felton@qub.ac.uk.

Programme structure, levels, modules and credits

Students taking the PGDip in Materials Science must register for and pursue a course of study equivalent to 120 CATS points, all at level M. The programme is offered as a two year part-time web-delivered distance learning course. The following modules, all at level M, are offered as part of this programme.

Status	Code	Title	Pre/co-requisites	CATS
Compulsory	PHYxx11	Fundamentals of Materials Science	None	30
Compulsory	PHYxx12	Materials Characterisation	None	20
Compulsory	PHYxx13	Materials Science Case Study	PHYxx11, PHYxx12	10
Optional	PHYxx21	Magnetic and Electronic Materials	PHYxx11, PHYxx12, PHYxx13	20
Optional	PHYxx22	Optical and Plasmonic Materials	PHYxx11, PHYxx12, PHYxx13	20
Optional	PHYxx23	Electron Microscopy and Scanning Probe Microscopy	PHYxx11, PHYxx12, PHYxx13	20
Optional	PHYxx24	Thin Film Techniques and Sensor Technology	PHYxx11, PHYxx12, PHYxx13, PHYxx21	20
Optional	PHYxx25	Materials Modelling and Simulation	PHYxx11, PHYxx12, PHYxx13	20

It should be noted that all optional modules may not be available in a particular year, depending on module enrolment numbers. For further details, see the Module Specifications.

In the first year the students take the three compulsory modules PHYxx11, PHYxx12 and PHYxx13. In the second year students take three optional modules of 20 CATS points each. It is also possible to include one level M 20 CATS points module from another physical science or engineering programme, such as the Plasma Physics MSc, instead of one optional module.

It should be noted that two options exist for taking the module PHYxx13 Materials Science Case Study:

- A residential case study using the materials characterisation facilities in the School to obtain experimental data

- A distance learning case study using simulated or theoretically obtained data supplemented with experimental data provided by the module coordinator.

Awards, credits and learning outcomes

Examinations

Assessment criteria are linked to the learning outcomes for each module. A range of assessment instruments are used including laboratory/simulation-based assignments, individual projects, practical exams, presentations, written coursework and unseen written exams.

The pass mark for all taught modules is 50%. Students are normally permitted one further attempt to pass a failed module with the mark used in calculating the final award capped at 50%.

Students who, at the first attempt, have failed one module, will be referred to the Pastoral Care Committee.

Progression

Students are normally only allowed two attempts at passing a module. To progress to the MSc the students have to pass 120 CATS worth of modules. Students who, at the first attempt, have failed taught modules with a combined value greater than 40 CATS points will normally not be permitted to proceed to the MSc.

Awards

Postgraduate Diploma awards will be made in accordance with the following mark scale, as set out in the University's Study Regulations for Postgraduate Taught Programmes:

- 70+ Pass with distinction
- 60+ Pass with commendation
- 50+ Pass
- Below 50 Fail

Students, who have achieved at least 60 CATS points, may opt to be considered for the award of the Postgraduate Certificate.

Learning outcomes

Learning outcomes and assessment methods across the programme have been developed in line with relevant QAA Master's Level guidelines as follows.

Learning outcomes: Knowledge and understanding

Students will have developed deep knowledge and understanding of:

KU1. The underpinning principles of materials science.
KU2. Material characterisation techniques.
KU3. Material selection, including knowledge of interaction between composition, microstructure and properties of materials.
KU4. At least one specific area of material science, depending on choice of module.

Teaching and assessment methods: Knowledge and understanding

As this programme is delivered through a web-based distance learning method the core of the knowledge and understanding content will be presented in structured notes on-line. To supplement this there will be assignments in all modules as well as on-line discussions. These will both form part of the assessment of the modules, together with formal examinations for most modules. For project work the knowledge and understanding will be assessed through formal written reports, oral presentations and continual assessment throughout the project.

Learning outcomes: Subject specific skills

Students will have developed their ability to:

SS1. Select and critically discuss the appropriate materials for an engineering application, taking into account final materials properties and production methods.
SS2. Choose the appropriate materials characterisation methods for a materials science / engineering problem.
SS3. Interpret and critically analyse data from materials characterisation techniques.

Teaching and assessment methods: Subject specific skills

As this programme is delivered through a web-based distance learning method the core of the content will be presented in structured notes on-line, which includes subject specific skills. To supplement this there will be assignments in all modules as well as on-line discussions. These will both form part of the assessment of the modules, together with formal examinations for most modules. The ability to plan and carry out research tasks will be developed and assessed to some extent in the Materials Science Case Study, but most strongly in the Materials Science Research Project.

Learning outcomes: Cognitive skills

Students will have developed their ability to:

CS1. Learn independently.
CS2. Carry out structured organisation of their own work.
CS3. Analyse problems and situations.
CS4. Combine their knowledge and understanding both gained in this course and from previous learning situations, to solve a variety of physical and engineering sciences problems.

Teaching and assessment methods: Cognitive skills

Because of the distance learning method of deliver, students will by necessity have to learn independently, under guidance, to succeed in this course. This will also require ability to structure and organise their own work, so that the assessment of these skills are implicit in all forms of assessment, though they are not explicitly measured. Both the Materials Science Case Study and the Research Project explicitly require the students to analyse problems and situations, using the knowledge gained in the other modules, as well as previous learning situations, to achieve this.

Learning outcomes: Transferable skills

Students will have developed:

TS1. Organisation and time-management.
TS2. Presentation skills, oral and written.

TS3. Ability to meet deadlines.
TS4. Ability to work with and for others, including as part of a team.
TS5. Problem solving skills.

Teaching and assessment methods: Transferable skills

The distance learning aspect of this programme means that organisation and time-management become even more important for successful completion of the course than a more traditional course. The participation in the on-line discussions and completion of the assignments require both presentation skills and ability to work to deadlines. The on-line discussions also develop the students' ability to work with others, as does the Materials Science Case Study module. Problem solving skills form part of all modules and are generally assessed in both assignments and formal examinations. The successful completion of the Materials Science Research Project also heavily relies on problem solving skills.

Development of learning outcomes

The development of the learning outcomes is specified in the attached matrix.