

## Programme Specification (PG)

Awarding body / institution:	Queen Mary University of London
Teaching institution:	Queen Mary University of London
Name of final award and title:	MSc Materials Science and Engineering
Name of interim award(s):	N/A
Duration of study / period of registration:	Duration of study for QMUL degree = 2 years, of registration = 3 years
Queen Mary programme code(s):	J511
QAA Benchmark Group:	Masters Degree
FHEQ Level of Award:	Level 7
Programme accredited by:	Institute of Materials Minerals and Mining
Date Programme Specification approved:	
Responsible School / Institute:	School of Engineering & Materials Science

Schools / Institutes which will also be involved in teaching part of the programme:

Collaborative institution(s) / organisation(s) involved in delivering the programme:

Queen Mary Engineering School, NPU

### Programme outline

This programme provides students with the opportunity to study for a masters level education with 2 top universities, NPU and QMUL. Students will be part of the renowned joint education institute, the Queen Mary University of London Engineering School of Northwestern Polytechnical University in Xi'an, PRC. The 3 year programme will lead successful students to the award of dual degrees. The programme will cover topics relevant to cutting edge developments in the field of materials science, including both theoretical and practical aspects that underpin the development and performance of materials.

Students will have the benefit of a masters degree from a Double First Class university in China and a Russell Group university in the UK that will be recognised throughout the world. The programme provides a fully international experience with students spending at least 9 months at QMUL in London. Students will be taught in English and receive English language tuition as part of the programme. The masters programme has a strong emphasis on research and students will complete a dissertation project supervised jointly by QMUL and NPU academic staff. The research projects will be co-ordinated between the two universities and lead to international research in topic areas such as smart composite materials, polymer electronic materials, materials for energy generation and storage and materials adapted for advanced 3D manufacturing techniques.

## Aims of the programme

The programme aims to replicate the high quality and well established materials programmes delivered in London but leverage on the combined capabilities of both institutions.

The general aims of the programme include :

- to provide a materials education of a standard recognised to be amongst the highest in UK and Chinese institutions
- to provide a platform for the development of professional engineers with a truly international outlook
- to take a multi-disciplinary approach to the elements of materials science and engineering, including design
- to educate our students in the scientific and mathematical principles underpinning materials science
- to enable all our students to achieve their academic potential by providing a stimulating, friendly and supportive environment
- to offer challenging programmes which provide our graduates with a clear pathway to Chartered Engineering status
- to prepare our graduates with discipline-specific knowledge and transferable skills that will equip them for employment and continued professional development through self-learning.

Specific aims include:

- analytical, creative, organisational, practical and communication skills,
- problem-recognition and solving abilities
- competence in discipline-specific topics which contribute to the solution of problems applied to materials science
- an appreciation of how theoretical and practical approaches can be synthesized to arrive at optimal solutions
- an appreciation of the financial context of the development of new materials and products
- an understanding of the relationship between their discipline and social, economic and environmental issues and constraints
- an appreciation of the relative merits of a proposed solution,
- the detailed skills needed to undertake a research, development or design project in depth, understanding the technical, financial and time limitations.

## What will you be expected to achieve?

Acquire contemporary factual knowledge in the area of Materials Research incorporating fundamental principles of Materials Science and Engineering and develop the ability to apply this knowledge in cutting edge research in Materials Science in a multidisciplinary context.

### Academic Content:

A 1	Assemble a body of contemporary factual knowledge incorporating the fundamentals of Materials Science and, as appropriate, generalize the application of this to industrial and research applications
A 2	Evaluate fundamental Materials Science principles as applied to realistic materials applications / problems
A 3	Synthesize fundamental physical concepts of core technologies so that the limitation of the experimental, mathematical and computational techniques available are fully recognised
A 4	Relate the multidisciplinary nature of modern Materials Science and the diversity of research areas to the impact Materials Engineering / Science has an impact on society and the environment

### Disciplinary Skills - able to:

B 1	Apply a comprehensive knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider context of engineering
B 2	Formulate and analyse complex problems to reach substantiated conclusions. This will involve evaluating available data using first principles of mathematics, statistics, natural science and engineering principles, and using engineering judgment to work with information that may be uncertain or incomplete, discussing the limitations of the techniques employed
B 3	Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed
B 4	Design solutions for complex problems that evidence some originality and meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health & safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards
B 5	Evaluate the environmental and societal impact of solutions to complex problems (to include the entire life-cycle of a product or process) and minimise adverse impacts
B 6	Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance
B 7	Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used

Attributes:	
C 1	Have the ability to analyse and solve problems individually and in groups
C 2	Have the ability to communicate knowledge and ideas verbally and in written reports
C 3	Apply scientific principles to a range of materials related applications
C 4	Understand both the application and limitation of mathematical, computational and experimental techniques available to an engineer
C 5	Have the ability to acquire a working knowledge of new experimental and/or computational techniques used in Materials Research within a short space of time.

### How will you learn?

The programme covers fundamental science and engineering concepts at an advanced level.

Opportunities to apply these concepts to real engineering problems.

The skills needed to work as an integral part of an international research team

### How will you be assessed?

The taught modules will be assessed through both coursework and examinations. The details are as outlined in the individual module specifications.

Project module will be assessed through a combination of written reports and vivas.

### How is the programme structured?

Please specify the structure of the programme diets for all variants of the programme (e.g. full-time, part-time - if applicable). The description should be sufficiently detailed to fully define the structure of the diet.

The programme is significantly longer than the equivalent programmes delivered in London to allow for the additional requirements common to the Chinese system. All credit for the QMUL degree will be attained within years 1 and 2. Year 3 will focus on the additional requirements for the Chinese degree, in particular a translation of the research dissertation into Chinese.

Students will spend year 1 studying at QMES in Xi'an China where they will complete a range of taught modules, these include the Chinese compulsory modules and a module focused on English language communications (all none credit bearing). Students will also start the joint research project module by completing a research proposal and broad area literature review.

In the second year students will move to London and take a number of level 7 modules with the UK based masters students. In addition, students will start the practical / modeling component of their project module.

The final year will be spent in Xi'an and will focus on the additional requirements for the NPU award.

In year 1 : 60 credits of taught modules will be delivered in Xi'an. The project module will be started but is only weighted in year 2. The English for Science and Engineering module and several compulsory Chinese modules are not weighted for the QMUL degree.

In year 2 : 60 credits of taught modules will be delivered in London. The project module will continue and all components required for the QMUL degree will be completed.

In year 3 : zero credits for the QMUL award. Students focus on completion of the additional requirements for the NPU award. In particular students will translate their thesis into Chinese and have a second viva. The QMUL supervisory relationship will be maintained to continue offering support to the student and any joint publications.

### Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Theoretical and practical research on socialism with Chinese characteristics	M17G1100 3	0	7	Core	1	Semesters 1 & 2
Dialectics of nature	M17G1100 2	0	7	Core	1	Semesters 1 & 2
English for Science and Engineering	QXU7111	0	7	Core	1	Semester 1

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Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Matrix theory Maths	NXC7101	0	7	Core	1	Semester 1
Microstructure Analysis of Advanced Materials	NXC7102	0	7	Core	1	Semester 1
Designing with Materials	QXU7112	15	7	Core	1	Semester 1
Professional Engineering Methods	QXU7211	15	7	Core	1	Semester 2
First Principles Simulation	NXC7201	15	7	Core	1	Semester 2
Materials Physics	NXC7202	15	7	Elective	1	Semester 2
Materials Science and Engineering	NXC7203	15	7	Elective	1	Semester 2

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Electrochemical energy storage systems	EMS760P	15	7	Core	2	Semester 1
Advanced Mechanical Modelling of Materials	EMS725P	15	7	Core	2	Semester 1
Advanced NanoComposites	EMS730P	15	7	Core	2	Semester 2
Solar Energy Engineering	EMS761P	15	7	Core	2	Semester 2
Joint Research Project	QXU7200	60	7	Core	1-2	Semester 2-4
Study on Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era	M17G1101 7	0	7	Core	1	Semesters 1 & 2

### What are the entry requirements?

The programmes will only be open to Chinese students so any student will have to qualify for entry to NPU, normally by the national entrance exam procedure for post-graduate entry. As such, all student must have passed the Chinese English Test (CET) . There will be no further English language requirement, as this will be covered within the degree programme (following the entry requirements and language delivery model established in the QMES UG degree programmes).

### How will the quality of the programme be managed and enhanced? How do we listen to and act on your feedback?

The Student-Staff Liaison Committee provides a formal means of communication and discussion between the school and its students. The committee consists of student representatives from each programme along with appropriate representation from staff within the school. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Student-Staff Liaison Committees meet regularly throughout the year.

The school runs a module feedback system for all modules, this forms part of the annual programme review and period review. The student office in NPU provides each student with a councilor that is available to provide support and access to the various systems within the University.

### What academic support is available?

The induction at the start of Semester 1 provides introductory talks on all the services and support mechanisms available within the school and university for new students. Similarly, when students come to the UK in semester 3 they will be eligible to join SEMS induction programmes.

The virtual learning environment (QMplus) has information on the different modules and supervisory advice for dissertations as well as personalised teaching timetables.

The Programme Director is able to support students with academic matters throughout the students studies. If they encounter any difficulties of a personal nature which are having an impact on their studies they can meet with either their tutor, councilor or the programme director as appropriate in China and their Academic advisor while in London.

### Programme-specific rules and facts

These are specified in the Academic Regulations for the Joint Programme. They include:

- a) a requirement to pass all modules, including the Chinese political/social modules
- b) graduation only when both degrees that comprise the Joint Programme have been completed
- c) the following regulations regarding attempts:
  - two resit attempts are permitted within the normal study period;
  - a further resit attempt is permitted in the 6 months period after the normal study period.
  - no module condonment or compensation is permitted
  - students need to pass all first year modules, attain ATAS approval and a visa before commencing year 2 in the UK

It should be further noted that:

- a) the credits listed by NPU are a measure of load in the Chinese system that is related to the contact hours
- b) different marking scales are used at QMUL and NPU, and the procedures for conversion between these marking scales is defined in the regulations
- d) the award of the number of certificates within the NPU regulations is specified

### How inclusive is the programme for all students, including those with disabilities?

Admission requirements follow NPU process

Programme Title: MSc Materials Science and Engineering

In years 1 and 3 Students have access to counsellings and disabilities services within the NPU system  
In years 2 Students have access to counsellings and disabilities services within the QMUL system

### **Links with employers, placement opportunities and transferable skills**

In years 1 and 3 support is provided through NPU system  
In years 2 support is provided through QMUL systems

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## **Programme Specification Approval**

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**Person completing Programme Specification:**

**Person responsible for management of programme:**

**Date Programme Specification produced / amended by  
School / Institute Education Committee:**

**Date Programme Specification approved by Taught  
Programmes Board:**