PROGRAMME SPECIFICATION

Degrees:

Programme Title	Final Award	Duration of study/ years	Programme & route codes	Level
Advanced Materials Science & Engineering	MSc	1	PMSF-QMMTLS1-PSAMSZ	7

Ownership	
Awarding institution:	Queen Mary University of London
Teaching institution	Queen Mary University of London
Academic Department(s) involved in programme delivery	School of Engineering and Materials Science
Main location(s) of study	Mile End Road, London
External references	
QAA Benchmark Group	Engineering
External Accreditor (if applicable)	Institute of Materials, Minerals and Mining (IoM3)
Accreditation received	2022
Accreditation renewal	

Specification Details	
Programme Lead	Dr Chinnapat Panwisawas
Student cohorts covered by specification	2025 entry
Date of introduction of programme	September 2019
Date of programme specification / amendment	15 November 2024
Approval by School Education Committee	15 November 2024
Submitted to Directorate of Governance & Legal Services	16 November 2024

1. Programme Overview

The MSc offers high quality postgraduate training in methods and practice of research including relevant transferable skills that are not normally offered in conventional taught MSc courses. The MSc degree serves both as a qualification in its own right for entry to a research career in industry or as an enhanced route to a PhD through further research.

The programme provides an insight into areas of manufacturing, planning and control systems, knowledge based systems and measurements and manufacturing systems. It is interdisciplinary in nature and involves a combination of theoretical and practical approaches. Taught modules concentrate on advanced Materials topics and the research project provides an intellectual and practical challenge and thus enables the student to demonstrate creativity and initiative and, where appropriate, forms a foundation for doctoral study. It includes a 90 credit project over the entire year. This enables a strong focus on the project research, and allows to build projects with strong industrial collaboration.

Research projects in Materials are drawn from a wide variety of applications in all of the specialisation areas, reflecting the strong research links that the staff members have industrial companies such as Airbus, Alstom, Rolls Royce, TWI, VW. Projects are offered inconjunction with industrial collaborators to provide industrial impact and enhanced job opportunities for the students.

2. Learning outcomes for the programme

In this degree programme we place strong emphasis not only on the technical content of our modules, but also on cross disciplinary skills vital for an engineer to be effective in the work place. We embed these skills in the technical modules on the programme, to ensure that the technical knowledge and understanding works as you progress through your degree, and also to allow you to graduate with skills you can apply to a range of future careers.

You will acquire broad training in scientific analysis, engineering modelling and numerical methods to be able to design, carry out and evaluate the results of computational models of engineering problems.

You will conduct a substantial research project of current engineering relevance using state of the art methods. The knowledge and skills you gain in the taught and the research part of the programme will enable you to seek employment in industrial Research and Development teams, as well as conduct further research in a PhD.

The overall aims of the programme are:
• to provide a materials education of a standard recognised to be amongst the highest in UK institutions
• 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.

This programme aspires to produce the type of highly skilled, motivated, creative and team-work oriented graduates which the related industry needs.

2.1 Academic Content

- Have acquired a body of contemporary factual knowledge incorporating the fundamentals of Materials Science and, as appropriate, recognise the application of this to Materials Science
- Have acquired sufficient knowledge of fundamentals of Materials Science principles as applied to realistic materials applications.
- Have an understanding of the fundamental physical concepts of core technologies so that the limitation of the experimental, mathematical and computational techniques available are fully recognised
- Have acquired an understanding of the multidisciplinary nature of modern Materials Science and the diversity of research areas that Materials Science has an impact on..

2.2 Discipline specific

- Demonstrate sufficient fundamental scientific and engineering principles to be able to work with materials science related problems and projects.
- Appreciate the wider multidisciplinary scientific and engineering context of Materials Research and its underlying principles.
- Appreciate the social, environmental, ethical economic and commercial considerations affecting their engineering judgement
- The ability to carry out research in a multidisciplinary environment and to collaborate effectively with scientists and engineers from diverse backgrounds.

2.3 Attributes

- Have the ability to analyse and solve problems individually and in groups
- Have the ability to communicate knowledge and ideas verbally and in written reports
- Apply scientific principles to a range of materials related applications
- Understand both the application and limitation of mathematical, computational and experimental techniques available to an engineer
- 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.

3 Learning and teaching approaches

Teaching methods are tailor-made to suit the size of classes and the nature of the subject. Each module has a combination of methods including lectures, tutorials, laboratory sessions,

industrial visits, workshops and group work. QMUL degrees combine face to face teaching and practical experiences with supported and structured on-line learning. Our virtual learning platform is referred to as QMplus. Through this platform you will be able to find details about your modules, assessments, timetables and other activities.

Projects throughout the programme are designed for you to exercise independent thinking, research and problem solving skills and are preferably undertaken in a related subject. Group work enhances your communication, organisational as well as technical skills.

3.1 Employers Links

The school has an active Industrial Liaison forum (ILF). This forum has a direct impact on the programmes by encouraging employers to sponsor and support the students and to provide real design case studies to engage the students throughout the curriculum. Recent case studies that have been taught and assessed were delivered by Bridgestone, DePuys, Baxter, Artis, Corus, BAe, DSTL, Rolls Royce. The ILF takes place twice a year, in Autumn and Spring.

3.2 Assessment methods

You can expect a variety of different types of assessment methods:

Written assessment

- Examinations
- Progress tests
- Online assignments, quizzes and tests
- Report and other writing
- Peer assessment
- Practical

assessment

- Laboratory/workshop practicals
- Design work
- Programming tests
- CAD & simulation tool tests
- Oral assessment
- Oral presentations
- Poster presentations
- Group presentations
- Design presentations

Assessments allow you to demonstrate that you have met the intended learning outcomes for each module and contribute towards your achievement of the programme learning outcomes. There are summative (formal) assessments during and/or at the end of each module and well as ongoing formative (informal – no marks) through the degree. Examinations are intended to assess understanding rather than recall. Group assessments may incorporate peer marking.

Assessments operate in accordance with QMUL Regulations and established procedures. Feedback is provided through a number of formats, including:

- Oral (e.g. face to face during or after face-to-face sessions, video)
- Personal (e.g. discussion with staff)
- Interactive (e.g. Team Based Learning, peer-to-peer, online quizzes)
- Written (e.g. solutions, model answers, comments on work)

You will receive feedback on intermediate, developmental assessments such as project plan and progress reports and on coursework assessments. This feedback may be summarised for the whole cohort or be directed towards your work individually. The final project thesis will be assessed in September. You will complete a presentation as well as an oral examination.

Feedback is intended to help you learn and you are encouraged to engage with it, reflect upon it and discuss it with your module organiser. Feedback will be provided on coursework and practical assessments within an appropriate time. Feedback on examination performance is available upon request from the module leader and overall class performance feedback on a question-by-question basis may also be provided.

3.3 Support of students

We aim to support all students throughout their time with us. We encourage students to develop independently but this does not mean that you need to be alone. We know that support and encouragement from staff and fellow students is very important throughout your degree.

The Student Support Officer for SEMS is the first contact for any personal support; they can be contacted by email: sems-office@qmul.ac.uk with any questions or to arrange an appointment.

3.3.1 Advisor arrangements

You will be allocated an Advisor when you register. You will meet with your Advisor at least twice per semester, but can always book more meetings if you need help.

3.3.2 Central support services Disability and Dyslexia Service

QMUL has a central Disability and Dyslexia Service (DDS) that offers support for all students with disabilities, specific learning difficulties and mental health issues. The DDS supports all QMUL students

Advice and Counselling

QMUL offers a wide range of advice, guidance and self-help material. These free and confidential professional services are available to all students.

4 Programme structure

45 credits of taught modules will be taught in the first semester from September until December and a further 45 credits of taught modules will be taught in the second semester from January until April. All taught module examinations will be in the standard examination periods during January and May. The 90 credit Research project will be completed over 3 semesters.

The modules making up the programme are presented in the table below.

Module	Semester	Title		Credit
EMS715P	A,B,C	Extended Research Project	Core	90
EMS724P	A	Computational Engineering	Compulsory	15
2 from:				
EMS718P	A	Nanotechnology and Nanomedicine	Elective	15
EMS712P	A	Macromolecular Engineering	Elective	15
EMS717P	A	Renewable Energy Sources	Elective	15
EMS760P	A	Electrochemical Energy Storage Systems	Elective	15
EMS740P	A	Machine Learning and Artificial Intelligence for Engineering	Elective	15
EMS705P	B	Environment, Ethics and Economics in Engineering Design	Compulsory	15
2 from:				
EMS709P	B	Computational Fluid Dynamics	Elective	15
EMS761P	B	Solar Energy Engineering	Elective	15
EMS732P	B	Digital Manufacture for Healthcare Innovations	Elective	15
EMS735P	B	Biocompatibility Evaluation for Clinical Innovation	Elective	15
EMS741P	B	Deep Learning for Data and Image Analysis	Elective	15
EMS730P	B	Advanced Nanocomposites	Elective	15

The credit load for elective modules are to be balanced across semesters.

Note: The modules, structure and assessments presented in this Programme Specification are correct at time of publication but might change as a result of student and staff feedback and the introduction of new or innovative approaches to teaching and learning. You will be consulted and notified in a timely manner of any changes to this document.

6 Entry requirements

Students will be admitted according to the entry requirements found at:

https://www.sems.qmul.ac.uk/pgadmissions/

Quality assurance

6.1 Student Voice Committee (SVC) meetings

The School has a Student Voice Committee and students on this programme are represented on this committee. The committee meets twice during each semester and is made up of the following members:

- Academic Lead for Student Experience (Chair)
- Student Support Officer (Secretary)
- Directors of the relevant programmes
- At least one student representing the relevant programmes

The elections for the postgraduate representatives are organised through the Student Union. SVC agendas and minutes are found on the SEMS QMplus landing page. Relevant items on the minutes are referred to the appropriate School committees for consideration and feedback.

6.2 Evaluating and improving the quality and standards of teaching and learning

We assess our provision of teaching by:

- Module review by means of student experiance questionnaires and module organisers' reports.
- Annual staff appraisal.
- Peer observation of teaching.
- External examiners' reports.
- Periodic Programme Review by the University.

The Committees within SEMS that have responsibility for monitoring and evaluating quality and standards are

- Education Committee
- Student Experience Committee
- Academic Standards Committee
- Student Voice Committee
- Subject Examination Boards
- Degree Examination Boards

The ways we receive student feedback on the quality of teaching and your learning experience are:

- Annual Postgraduate Taught Experience Survey (PTES)
- Student Voice Committee
- Student Questionnaire evaluation for each of your modules
- Student forums on QMplus, including module and programme specific forums as well as ones covering more general topics
- Discussions with Advisors.

6.3 Staff development

Our staff are continuously engaging with professional development activities, including courses and workshops related to teaching and learning.