Programme Title: BEng Chemical Engineering/with Industrial Experience/with Year Abroad

Programme Specification

Awarding Body/Institution	Queen Mary, University of London
Teaching Institution	Queen Mary, University of London
Name of Final Award and Programme Title	BEng (Hons) Chemical Engineering BEng (Hons) Chemical Engineering with Industrial Experience BEng (Hons) Chemical Engineering with Year Abroad
Name of Interim Award(s)	CertHE, DipHE
Duration of Study / Period of Registration	3/4 years
QM Programme Code / UCAS Code(s)	H812/H816/H81Y/H811
QAA Benchmark Group	Engineering
FHEQ Level of Award	Level 6
Programme Accredited by	Institute of Chemical Engineers, accreditation pending
Date Programme Specification Approved	
Responsible School / Institute	School of Engineering & Materials Science

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

Institution(s) other than Queen Mary that will provide some teaching for the programme

Programme Outline

Engineering is fundamental to the economic and social prosperity of the UK. It is the profession responsible for the creation of all material objects and systems necessary for modern life from concept to customer to decommissioning. IChemE (the Institution of Chemical Engineers, UK) identified in its Technical Roadmap for 21st century chemical engineering six broad areas of critical global importance where chemical engineers will have enormous influence. These are (i) health, safety, environment, (ii) sustainable technology, (iii) energy, (iv) food and drink, (v) water and (vi) bio-systems.

The modern society relies on the work of Chemical Engineers who develop and design the processes that make the useful products for the society by efficient use and management of resources including water and energy while controlling health and safety procedures and protecting the environment. Your studies at QMUL will be a foundation for life aimed at developing a deep understanding of fundamental and advanced technical principles, analytical tools, and competence in their application together with a wide range of management, personal and professional skills. The programme will provide you with essential tools based on the concept of sustainability and low carbon footprint for changing raw materials into useful products in a safe and cost effective way. As a qualified Chemical Engineer you will understand how to alter the chemical, biochemical or physical state of a substance, to create everything from health care products (face creams, shampoo, perfume,

drugs) to food (dairy products, cereals, agro-chemicals) and water (desalination for freshwater) to energy (petroleum to nuclear fuels). An excellent way to develop these skills is to undertake an industrial placement as an integral part of your degree studies.

The School places emphasis on both teaching and research. We have particular research strengths in sustainable energy engineering, renewable energy materials, polymers, materials engineering (including the creation of complex components from powders, composites and polymers), thermofluids engineering, biomedical engineering, and nano-engineering. Our interdisciplinary research strengths are combined in the Materials Research Institute and the Institute for Bioengineering.

Upon graduation on our BEng programme you will be able to work as a projects engineer, design engineer or operations engineer in chemical, petroleum, food and pharmaceutical industries. You will have satisfied the academic criteria for obtaining the Incorporated Engineer status, and will be able to obtain the Chartered Engineer status after a few years of relevant further learning and professional experience. The ability of an engineer to think clearly and logically and to solve problems is widely appreciated by many other professions and your studies may well be a stepping stone to many alternative careers other than Engineering – a real foundation for life and for a lifetime of learning.

The first two years of the Chemical Engineering programme at QMUL provide a firm grounding in subjects fundamental to all branches of engineering, including mathematics, thermodynamics, fluid mechanics, heat transfer and control engineering. They also provide an insight into basic chemistry and process engineering and computing. These subjects are developed further in Student Centred Learning modules, which run through the first two years and include group and individual project work that helps you to apply the academic and practical skills learned in the other modules to the solution of practical chemical engineering problems, as well as the Integrated Chemical Engineering Design module, in which in a group you will be working on a design problem that is related to the current energy technology challenges and in particular to the renewable energy field.

The third year gives you the opportunity to expand your knowledge through modules that address more advance chemical engineering topics, and you also have the opportunity to choose options in the areas of sustainable energy engineering, manufacturing processes and renewable energy materials. It also includes an integrated Chemical Engineering Design project, in which you work in a team that will be responsible for the detailed design of a specific unit of a larger plant, so that the class as a whole will ultimately be designing a complete industrial plant.

Aims of the Programme

To prepare graduates for professional careers in the process industries. Enable them to understand and solve technical problems in general, and to be able to take advantage of further education, research and experience throughout their careers.

To develop incoming students' knowledge, skills, understanding and attitudes to those of more able professional chemical engineers.

To impart in-depth knowledge of core chemical engineering subjects and principles through the underlying mathematics, science and associated technologies.

To provide knowledge and understanding of leading-edge subjects within modern chemical engineering with specific aim to renewable bio-based energy technologies and materials.

To develop the ability to reason critically, collect, analyse, evaluate and synthesise data to facilitate optimisation, gather and use information, apply concepts and methodologies.

To develop skills especially in (a) drawing rational conclusions from experimental investigations, (b) information technology, including the use of calculation and design packages, computer graphics and word processing, and (c) communication, both oral and written.

To impart understanding of process principles through problem solving, via open-ended projects and assignments, particularly process design exercises.

Programme Title: BEng Chemical Engineering/with Industrial Experience/with Year Abroad

To encourage professional attitudes through the study of the human, environmental, and ethical implications of technology, through team work, and through working with established professionals.

To develop an understanding of business and economic side of chemical engineering solutions through analyses of real cases and projects

What Will You Be Expected to Achieve?

Academic Content:	
A 1	Knowledge and understanding of mathematics, science and engineering principles (including ICT and technically leading subjects), relevant to the process industries.
A 2	Understanding of economic evaluation and business principles relevant to engineering and engineers.
A 3	Knowledge of the role of the engineer in society and as a team player, and the constraints within which their engineering judgement will be exercised.
A 4	Knowledge of the professional and ethical responsibilities of engineers.
A 5	Knowledge of the international role of the engineer and the impact of engineering solutions in a global context.
A 6	Knowledge of the principles of process selection and design.

Disciplinary Skills - able to:	
B 1	Demonstrate ability in identifying, defining and solving engineering problems using mathematical and modelling techniques with due cognisance of science and engineering principles.
B 2	Show ability in the selection, design and optimisation of process engineering systems and processes.
B 3	Recognise how to ensure safe operation of apparatus and plant whilst exercising judgement of economic and environmental constraints.
B 4	Evaluate and integrate information and processes through individual and team project work; communicating articulately in the process.
B 5	Show ability to plan an experiment (or project), analyse and interpret data recorded in the laboratory and on processes to deliver supported recommendations and/or solutions.
B 6	Use laboratory and pilot equipment well and safely, including advanced analytical apparatus.
B 7	Observe and record data in the laboratory and on processes.
B 8	Use computer packages appropriate to process engineering. Integrate them with project, laboratory and design work.
B 9	Prepare technical reports, technical research papers and dissertations to a level that demonstrates initiative and in-depth thinking - research the material(s) required to produce these.
B 10	Understand technical drawings. Prepare block, flow & piping and instrumentation, and mechanical drawings.

Programme Title: BEng Chemical Engineering/with Industrial Experience/with Year Abroad

Attributes:	
C 1	Communicate in a detailed and effective manner using written, oral, graphical and presentational skills – sorting data in the most appropriate manner.
C 2	Use IT effectively (e.g. process simulator, word processor, spreadsheet, database, presentation, CAD, email, WWW and specialist software) and integrate the benefits well with communication and reporting.
C 3	Use mathematical skills appropriate to a qualified professional engineer.
C 4	Work independently.
C 5	Work in a team environment.
C 6	Manage workloads and time effectively and efficiently.

How Will You Learn?

Teaching materials are delivered through a combination of lectures, problem solving classes, laboratory practicals, and a variety of coursework. In addition problem-based learning plays a role in the your first and second years.
You will undertake a major individual research project in the third year, which is designed to assimilate and utilise knowledge gained throughout the degree towards approaching a real Engineering problem.

The 3rd year project allows you to participate in the specialist internationally-recognised research taking place within the School of Engineering and Materials Science.

How Will You Be Assessed?

Assessment is continuous throughout the degree, with written reports, projects, presentations, group work and exams (exams take place in the summer only). The degree programme has eight modules per year split over two semesters, and most are assessed by a combination of coursework and an end of year exam. Some modules, such as the research and design projects, count for two or four modules. In the third year, you can select from a range of module options allowing you to tailor your degree to specific areas of interest within your specialist degree programme.

How is the Programme Structured?

Please specify the full time and part time programme diets (if appropriate).

We also offer a BEng degree 'with Industrial Experience' where you would take a year working in a Chemical Engineering related industrial position either after your second or third years of study. You are paid by the company during this year which also counts towards your degree. If you are not registered on a 'with Industrial Experience' programme you can opt into it at any stage prior to taking your placement. You would extend your studies by a year as you undertake a structured programme at one of our many partner companies. To support this activity we employ a full time Industrial Placement Manager in the School, who supports you through the application process and then manages the programme whilst you are on the placement. Recent

placement employers include: DSTL, RollsRoyce, DePuy, Alcoa, Microsoft, ARTIS, GE, Caterham F1 & Philips. This exciting opportunity gives you a valuable insight into future careers and enhances employability.

The "with Year Abroad" version of the programme enables students to study the full degree at QMUL with an additional year abroad with one of our internationally excellent partner universities. Between the second and third years of of your QMUL programme you will spend a year at a partner university abroad. A total equivalent to 120 credits of study should be completed during this year, and you should pass at least 90 credits to have this study recognised.

Academic Year of Study FT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Mathematics and Computing for Engineers 1	DEN4122	15	4	Compulsory	1	Semester 1
Mechanics of Fluids I	DEN4101	15	4	Compulsory	1	Semester 1
Engineering Chemistry	DEN4401	15	4	Compulsory	1	Semester 1
Student Centred Learning for Chemical Engineers 1	DEN4402	30	4	Core	1	Semesters 1 & 2
Mathematics and Computing for Engineers 2	DEN4123	15	4	Compulsory	1	Semester 2
Thermodynamics 1	DEN107	15	4	Compulsory	1	Semester 2
Chemical Engineering: Principles and Practice	DEN4404	15	4	Compulsory	1	Semester 2

Academic Year of Study FT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Student Centred Learning for Chemical Engineers 2	DEN5402	30	5	Core	2	Semesters 1 & 2
Integrated Chemical Engineering Design	DEN5410	15	5	Compulsory	2	Semester 1
Mass Transfer and Separation Processes	DEN5412	15	5	Compulsory	2	Semester 1
Chemical Reaction Engineering 1	DEN5401	15	5	Compulsory	2	Semester 1

Programme Title: BEng Chemical Engineering/with Industrial Experience/with Year Abroad

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Control Systems Analysis and Design	DEN5200	15	5	Compulsory	2	Semester 2
Heat transfer and Fluid Mechanics 1	DEN5208	15	5	Compulsory	2	Semester 2
Chemical Reaction Engineering 2	DEN5411	15	5	Compulsory	2	Semester 2

Academic Year of Study FT - Year 3

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Integrated Chemical Engineering Design Project	DEN6410	30	6	Compulsory	3	Semesters 1 & 2
Heat Transfer and Fluid Dynamics 2	DEN6208	15	6	Compulsory	3	Semester 1
Environmental Properties of Materials	MAT507	15	6	Compulsory	3	Semester 1
Environmental Engineering	DEN320	15	6	Compulsory	3	Semester 2
Advanced Safety Engineering	DEN6440	15	6	Compulsory	3	Semester 2
Energy Conversion Analysis	DEN5107	15	5	Compulsory	3	Semester 1
Particle Technology and Advanced Separation Processes	DEN6413	15	6	Compulsory	3	Semester 2

What Are the Entry Requirements?

Minimum Entry Requirements with A-levels are:
AAB must include Maths A-level and Physics or Chemistry.
Maths A-level must be a B or above

Other qualifications:
International Baccalaureate - 34 points or above overall, with maths and physics or chemistry at higher level 6
European Baccalaureate - 80% or above including maths and science
French Baccalaureate - 14/20 overall, with 14/20 in maths and science
HE Advanced Diploma - Grade B or above overall, with Maths A-level grade B or above

How Do We Listen and Act on Your Feedback?

he 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 year of the programme, together with appropriate

Queen Mary University of London

representation from staff within the School. It is designed to respond to both the general needs of students, and subject specific concerns, as well as act as a forum for discussing programme and module developments. Student-Staff Liaison Committees meet regularly throughout the year.

The chair of the SSLC sits on the School's Education Board, which advises the School's Director of Taught Programmes on all matters relating to the delivery of taught programmes at School level, and ensures that student feedback is fed into the reviewing of modules and programmes. Student views are also incorporated in the Committee's work in other ways, such as through the National Student Survey (NSS), student module evaluations and module forums. We also use the forums to listen to student feedback on an individual module basis and develop materials and support classes to address comments or requests suggested in the forum.

Student representation is also present in the following School committees: All Staff Meeting, Education Board and Student Experience Group.

All Schools operate an Annual Programme Review (APR) of their taught undergraduate and postgraduate provision. APR is a continuous process of reflection and action planning which is owned by those responsible for programme delivery; the main document of reference for this process is the Taught Programmes Action Plan (TPAP) which is the summary of the School's work throughout the year to monitor academic standards and to improve the student experience.

Academic Support

Academic support for individual modules is the responsibility of the module organiser and co-organiser(s). These are supported by Teaching Associates and post-graduate students, many of whom will have studied the modules themselves as undergraduates in the School. In addition there is technician support available for practical sessions.
Academic support for the programme as a whole, including choosing optional modules and possible transfer between programmes is provided in the first instance by the Personal Tutor, with further guidance available from the Senior Tutor and Programme Director, the latter having overall responsibility for the programme structure. The Programme Director in turn reports to the relevant Division in the School, the Teaching Chair of which is a member of the School's Education and Learning Committee.
We additionally have a School Office, with many student facing staff available to support student learning and one full time Student Support Officer. These staff members will help with coursework submission, time tabling concerns and other general administration as well as providing pastoral support and further guidance on dealing with extenuating circumstances. We also have staff designated to support students in achieving industrial placements and providing careers advice.

Programme-specific Rules and Facts

The programme operates under the standard QMUL rules for BEng programmes.

Specific Support for Disabled Students

Queen Mary 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 Queen Mary students: full-time, part-time, undergraduate, postgraduate, UK and international at all campuses and all sites.

Students can access advice, guidance and support in the following areas:
• Finding out if you have a specific learning difficulty like dyslexia
• Applying for funding through the Disabled Students' Allowance (DSA)
• Arranging DSA assessments of need
• Special arrangements in examinations

- Accessing loaned equipment (e.g. digital recorders)
- Specialist one-to-one "study skills" tuition
- Ensuring access to course materials in alternative formats (e.g. Braille)
- Providing educational support workers (e.g. note-takers, readers, library assistants)
- Mentoring support for students with mental health issues and conditions on the autistic spectrum.

Links With Employers, Placement Opportunities and Transferable Skills

We place a strong emphasis on supporting our students in achieving quality graduate positions at the end of their degrees. In the first year, all students take a transferable skills module, designed to both support them through the transition to university life, and also introduce the important employability skills they will need in later life. We run an extensive range of employability training events, with weekly timetabled careers slots and field trip visits to more than 20 collaborating companies. Our relationships with both the Careers Group and Student Services are strong in SEMS, and we co-deliver our training in study skills and career development for maximum benefit.
Since 2011 we have had a placement officer working in the school dedicated to supporting our new “with Industrial Experience” programmes which have grown immensely in popularity in the last few years.

The School has run Industrial Liaison Forums (ILFs) each academic year since the School was formed in 2007. Since 2010, the Autumn event is focused on encouraging more industrial participation in our research programmes, rewarding excellence by allowing companies to present student prizes for academic excellence across the School and also as a way of allowing companies and our students to interact through themed panel sessions and a careers fair. The Spring event aims to showcase our best third year project students and all of our group MEng projects. This event again allows extensive networking opportunities between employers and placement providers with all of our students in SEMS. Typically these events are attended by over 50 companies including our regular student prizes sponsors: Tata Steel, Eaton Industries, JRI, GSK, RollsRoyce, Apatech, Morgan Cruicible, ARTIS, NPL, TWI, Becker Coatings; Advanced Healthcare Ltd & Apatech. Many of these companies are also actively engaged in student projects and in addition to these our events are also attended by additional companies that also collaborate with projects such as: Jaguar Land Rover, Alcoa, Perryman, DSTL, BAe, Airbus, Corin, DePuy, Baxter's Healthcare, Norman Foster Partners and many others. In recent times we have extended these events to encourage participation from our more recent alumni as well.

These forums have a direct impact by encouraging employers to sponsor and support the student projects and to provide real engineering case studies to engage the students throughout the curriculum. Many of these companies also support our lecture programme in individual modules. Recent case studies that have been taught and assessed were delivered by companies including Tata, Gillette, Sugru, JRI, DuPuy, Apatech, Artis, BAe, DSTL, Rolls Royce, Perryman and Advanced Healthcare ltd.

Programme Specification Approval

Person completing Programme Specification	Dr Henri Huijberts
Person responsible for management of programme	Dr Roberto Volpe/Dr Henri Huijberts (acting)
Date Programme Specification produced/amended by School Learning and Teaching Committee	
Date Programme Specification approved by Taught Programmes Board	

Queen Mary University of London