Introduction
Engineers are responsible for the creation of all material objects and systems necessary for modern life, from concept to customer to de-commissioning. The economic and social prosperity of the UK and the world depend greatly on engineering activities. The Technical Roadmap for 21st century chemical engineering published by the IChemE (the Institution of Chemical Engineers, UK) in 2007 identified 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.

Chemical Engineers develop and design the processes to make everything the modern society needs: from advanced polymeric materials (packaging, electrical goods, electronics, automotive, aircrafts) to 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). They do this by efficient use and management of resources including oil & gas, water and energy while controlling health and safety procedures and protecting the environment.

Chemical engineers are concerned with small and large-scale chemical and biochemical processes in which materials undergo change. In practice, this may mean anything from a relatively small batch production of a drug to the massive scale of equipment needed to turn seawater to freshwater, natural gas to agrochemicals etc. by applying advanced reaction and separation processes. The complexity of the oil and gas industry offers a wide variety of opportunities for career development in the petrochemical industries. Further, engineering new materials with advanced properties is at the heart of the new technological drive of this century. Electronic Polymers, Biomaterials, Nanocomposites, and "Smart" Materials are examples of new material developments where the technological applications and impact on society are enormous.

Your study at MSc level at Bradford will be a foundation for life aimed at developing a deep understanding of 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 maintaining a low carbon footprint for changing raw materials into useful products in a safe and cost effective way.

The MSc in Chemical and Petroleum Engineering programme is designed smartly and provides balanced in-depth exposures to help you to find your career in three distinct areas: traditional chemical engineering, petroleum engineering and polymer engineering. The programme gives you the flexibility to choose the right combination of taught and research modules to train you for the career you have in mind.

Your choice of traditional chemical engineering route will expose you to advanced chemical engineering and process technology skills for exciting and challenging careers in the chemical and process industries. It also enables graduates in chemistry or other science/engineering disciplines to convert to a specialisation in chemical engineering.

Your choice of petroleum engineering route will enable you to match the needs in different areas of oil and gas production and in small as well as large operating and consulting companies.
With the choice of polymer engineering route you will be exposed to the design and operation of processes to engineer materials with advanced properties and will lead you to careers in many manufacturing industries e.g. automotive, aerospace etc.

Upon completion of the Programme you will have the capacity for meaningful interdisciplinary interaction, leadership roles, and professional growth. The School places emphasis on both teaching and research. We have particular research strengths in chemical and petrochemical engineering, polymers, energy, water, pharmaceutical engineering, coating and materials engineering. We have state of the art research facilities in these areas. We aim to produce MSc graduates who are imaginative, innovative, versatile and competitive. These graduates will be able to progress rapidly to professional positions of responsibility with minimal additional training and who will be able to provide technical, managerial and entrepreneurial leadership in specialist/interdisciplinary projects.

Upon completion you will be able to work as: (a) Project Engineer (b) Design Engineer (c) Operations Engineer or (d) Research and Development Engineer (R&D) in Chemical/Petroleum/Polymer/Food and Pharmaceutical Industries. You will have the capacity, potential and opportunity for professional growth to continue the path to Chartered Engineer (CEng) status. The ability of an engineer to think clearly and logically 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.

Programme Aims
The aims of the MSc programme are:

- To equip the students with the theoretical knowledge, concepts and skills necessary for original thought and problems analysis related to core chemical/petroleum/polymer engineering.
- To equip the students with the organisational, practical and computational skills necessary to carry out research in chemical/petroleum/polymer engineering fields.
- To enable the student to engage in research by carrying out, under expert supervision, a specific project in chemical/petroleum/polymer engineering.
- To provide bridging information to non-specialists enabling them to extend their career opportunities.

The aims of the Postgraduate Diploma are:

- To equip students with a broad base of theoretical knowledge, concepts and skills in the area of chemical/petroleum/polymer engineering.
- To equip the students with a broad base of organisational, practical and computational skills necessary to carry out research in chemical/petroleum/polymer engineering.
- To provide bridging information to non-specialists enabling them to extend their career opportunities.
Programme Learning Outcomes
To be eligible for the award of Postgraduate Certificate at FHEQ level 7 students will be able to:

LO1 have understanding of knowledge in advanced chemical engineering and in a range of state of the art process technologies to design, operate and manage processes and associated manufacturing plants

LO2 have understanding of knowledge in advanced materials and production technology and have a practical understanding of techniques/methodologies applicable to characterisation of materials structure and properties

LO3 be able with awareness to identify an area for further detailed investigation, design an experimental programme and be able to utilise research skills to critically evaluate and interpret newly developed data

LO4 have the ability to integrate engineering understanding and apply insight to the solution of real problems

LO5 be able to act autonomously in planning, conducting and reporting a programme of original research

LO6 have the ability to take a holistic approach in solving problems and designing systems

LO7 have the ability to design and operate processes efficiently to manufacture advanced polymeric materials

LO8 be able to critically interpret design, experimental and computational data

LO9 be able to work effectively in a team in order to meet shared objectives

LO10 have acquired skills to learn independently in familiar and unfamiliar situations with open mindedness and in the spirit of critical enquiry

LO11 have acquired skills to learn effectively for the purpose of continuing professional development and in a wider context throughout their career

Additionally, to be eligible for the award of Postgraduate Diploma at FHEQ level 7, students will be able to:

LO12 have depth and systematic understanding of knowledge in advanced petroleum engineering and in a range of state of the art process technologies to design, operate and manage complex processes and relevant manufacturing plants

LO13 be able to apply professional judgements to balance risks, cost, benefits, safety and reliability
LO14 be able to plan and carry out optimal operation of reaction, separation, heat transfer and mixing processes (lab & simulation based) and critically evaluate the outcomes

LO15 be able to plan and carry out optimal design and operation of chemical/petroleum products/polymeric materials (simulation based) and critically evaluate the outcomes

LO16 have the ability to use complex problem solving strategies to develop, monitor and update a plan for the solution of both technical and personnel contributions to meeting organisational need

Additionally, to be eligible for the award of Degree of Master at FHEQ level 7, students will be able to:

LO17 have a thorough understanding of optimisation, design, mathematical modelling and risk management practices that are at the forefront of chemical engineering.

LO18 have conceptual understanding to integrate and critically evaluate information from a variety of sources and to propose new hypothesis.

LO19 use wide knowledge and comprehensive understanding of design processes to complete a substantial work of independent study.

LO20 demonstrate effective independent learning and the ability to use complex problem solving strategies to develop innovative solutions.

Curriculum
The curriculum map shows the core (C) and optional (O) units for this programme, which extends over 12 months. It is made up of a taught element of 120 credits and an individual research project element of 60 credits. The taught element is structured in the form of modules carrying 10 or 20 credits arranged within the two semesters forming the academic session. The 60 credits MSc research project is carried out throughout the year. The curriculum may change, subject to the University’s Programme approval, monitoring and review procedures, as improvements are made each year. More detail, including learning outcomes, is available for each unit

Postgraduate Certificate

<table>
<thead>
<tr>
<th>FHEQ Level</th>
<th>Module Title</th>
<th>Type Core/option/elective</th>
<th>Credits</th>
<th>Semester(s)</th>
<th>Module Code</th>
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Students will be eligible to exit with the award of Postgraduate certificate if they have successfully completed 60 credits and achieved the award learning outcomes.

**Postgraduate Diploma**

<table>
<thead>
<tr>
<th>FHEQ Level</th>
<th>Module Title</th>
<th>Type</th>
<th>Credits</th>
<th>Semester(s)</th>
<th>Module Code</th>
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<tbody>
<tr>
<td>7</td>
<td>Upstream Production &amp; Refinery Operations</td>
<td>C</td>
<td>20</td>
<td>2</td>
<td>CPE7007-B</td>
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<tr>
<td>7</td>
<td>Research Skills</td>
<td>C</td>
<td>10</td>
<td>2</td>
<td>ENG7008-A</td>
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<tr>
<td>7</td>
<td>Food &amp; Pharmaceutical Processes Engineering</td>
<td>C</td>
<td>10</td>
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<td>CPE7006-A</td>
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<tr>
<td>7</td>
<td>Polymer Engineering</td>
<td>O</td>
<td>20</td>
<td>2</td>
<td>MAE7005-B</td>
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<tr>
<td>7</td>
<td>Risk Management</td>
<td>O</td>
<td>10</td>
<td>2</td>
<td>ENB7003-A</td>
</tr>
<tr>
<td>7</td>
<td>Engineering Computational Methods</td>
<td>O</td>
<td>10</td>
<td>2</td>
<td>ENG7007-A</td>
</tr>
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</table>

Students will be eligible to exit with the award of Postgraduate Diploma if they have successfully completed at least 120 credits and achieved the award learning outcomes.

**Degree of Master**

<table>
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<tr>
<th>FHEQ Level</th>
<th>Module Title</th>
<th>Type</th>
<th>Credits</th>
<th>Semester(s)</th>
<th>Module Code</th>
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<tr>
<td>7</td>
<td>MSc Project</td>
<td>C</td>
<td>60</td>
<td>1/2/3</td>
<td>ENG7002-E</td>
</tr>
</tbody>
</table>
Students will be eligible for the award of Degree of Master if they have successfully completed at least 180 credits and achieved the award learning outcomes.

Learning and Teaching Strategy
The teaching and learning strategy takes into consideration the learning outcomes, progression through the levels of study, the nature of the subject and the student intake, and the need for you to take greater responsibility for your own learning as you progress through the Programme. The strategies and methods implemented are:

- The teaching and learning methods implemented to engage students in developing their knowledge and understanding of the Programme include formal lectures (including those from Visiting Lecturers), case studies, tutorial exercises, practical demonstrations, directed learning and individual work.
- The methods implemented in developing the students’ intellectual skills include engaging with them during tutorial exercises, case studies, practical demonstration and supervised research or project work.
- The methods implemented in developing the students’ practical skills include demonstrations and practicals linked with the taught modules. The MSc students will also design and operate equipment and use control and measuring instruments, under supervision, during the initial phase of their research project. The PG/Dip students will operate analytical instruments, under supervision, during the initial phase of their research project.
- The methods implemented in developing the students’ transferable skills are implicit in the programme. The University of Bradford is well known for attracting students from a wide variety of background, experiences and countries. This and the learning facilities available to all students provide the conditions for students to develop and manage their learning. The University of Bradford modus operandi, Making Knowledge Work, is embedded in the philosophy of this Programme, particularly in the area of Engineering, Design and Technology. The School is well equipped with practical and computational facilities.

Assessment Strategy

- The method of assessment is by written examination and both analytical and experimental Programme work.
- The methods of assessment of intellectual skills are implicit in the written examinations, analytical and experimental Programme work and more particularly in their MSc dissertations.
- The methods of assessment of practical skills include feedback on laboratory work linked with the taught modules. Also, a large proportion of the mark
for the MSc dissertation and the PG/Dip will be attributed to Experimental Methods and Equipment and Presentation & Discussion of Results.

- The methods of assessment of transferable skills are built in the structure of the examinations, case studies, laboratory demonstrations and research or project work.
Assessment Regulations

MSc
This Programme conforms to the standard University Taught Postgraduate Regulations, which are available at the link below:
http://www.bradford.ac.uk/aqpo/ordinances-and-regulations/

However, there is 1 exception to these regulations as listed below:
To gain an accredited MSc award students must achieve 180 credits in total, comprising 160 credits at 50% or above and 20 credits at 40% or above.

If the above requirement is not met, but the University's taught postgraduate regulations are complied with, then a non-accredited MSc Engineering (DISCIPLINE) will be awarded.

Admission Requirements
The University welcomes applications from all potential students and most important in the decision to offer a place is our assessment of a candidate's potential to benefit from their studies and of their ability to succeed on this particular programme. Consideration of applications will be based on a combination of formal academic qualifications and other relevant experience.

The standard entry requirements for the programme are as follows:

In addition to satisfying the general admissions requirements of the University of Bradford, the candidates must have:

- 2.2 equivalent bachelors degree in Chemical Engineering.

Recognition of Prior Learning
If applicants have prior certificated learning or professional experience which may be equivalent to parts of this programme, the University has procedures to evaluate and recognise this learning in order to provide applicants with exemptions from specified modules or parts of the programme.
## Minor Modification Schedule

<table>
<thead>
<tr>
<th>Version Number</th>
<th>Brief description of Modification</th>
<th>Date of Approval (Faculty Board)</th>
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