

Programme Specification

MSc Professional Engineering

Campus (MH9AA) & Online delivery (OLPAU)

Programme(s) valid from:

Campus: September 2012

Online: September 2014

JACS code: H110

Valid for delivery at:

- **University of Derby**
- **Online**



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SECTION ONE: GENERAL INFORMATION

PROGRAMME TITLE AND INTERIM AWARDS

Masters Degree Professional Engineering

Final Awards:

A. MSc Professional Engineering

Interim Awards:

A1. Postgraduate Diploma Professional Engineering
A2. Postgraduate Certificate Professional Engineering

MODE OF STUDY

Part time and work based; part time and online distance learning

PROGRAMME START

Start date: September 2012, January 2013 and September 2014
Period of Validation: indefinite

AWARDING INSTITUTION

University of Derby

COLLEGE MANAGING THE PROGRAMME

College of Engineering and Technology (part time and work based)
University of Derby Online Learning (part time and online distance learning)

AWARDING INSTITUTION

University of Derby
University of Derby Online Learning

EXTERNAL BENCHMARK AND ACCREDITATION/RECOGNITION

The MSc Professional Engineering has used the following in curriculum design:

- QAA Subject Benchmarks for Engineering 2010
- QAA Master's degree characteristics (2010)
- The Framework for Higher Education Qualifications 2008, Level 7
- UK Standard for Professional Engineering Competence (*UK-SPEC*) 2013
- UK Output Standards to Masters Degree (Eng Council July 2011)
- Graduate Output Standard (*Engineering Professors' Council (EPC)*)
<http://www.epc.ac.uk/publications/standards/index.php>

JACS CODE

To be agreed

PROGRAMME SPECIFICATION LAST UPDATED

4th March 2016

SECTION TWO: OVERVIEW AND PROGRAMME AIMS

Rationale

The MSc Professional Engineering is designed as a work-based learning programme that will provide you with a flexible means of gaining an MSc in Professional Engineering through a range of work-based learning modules and traditional taught module content; if you require this as part of your learning programme. You will need to be in suitable employment as part of this Masters programme. This a professional programme and has been designed to accommodate anyone who will be returning to study after a break from education.

The MSc in Professional Engineering has been devised as part of the United Kingdom's (UK) Engineering Council's Gateways Project, Flexible Pathways to becoming a Professional Engineer.

The [Engineering Council](#) is the UK regulatory body for the engineering profession, it sets and maintains internationally recognised standards of professional competence and ethics.

The [Engineering Gateways](#) programmes provide a route to registration as a Chartered Engineer (CEng) through work-based learning. It provides an affordable mechanism for you to achieve the UK-SPEC threshold competences without the need to take significant time away from work. Through your MSc you will be working with a Professional Engineering Institution (PEI).

The programme structure is based around achieving your CEng through three phases, which are built into the normal MSc structure:

- *Entry Gateway* - This personal development audit (PDA) is a reflective summary of your education, qualifications, experience and competences to date.
- *Learning Contract* - These are your personalised learning outcomes created by matching the PDA against PEI/UK SPEC requirements.
- *Exit Gateway* - This is either a reflective summary of your work or an engineering dissertation based on a project; depending on your skills and needs. It also includes a viva voce.

You will identify, the Professional Engineering Institution (PEI) that you wish to register with when you start the MSc. At the end of the course you should be in a position to complete your CEng registration with the institution of your choice.

Key benefits of the course are that it includes a Learning Contract which is:

- flexible and unique to your needs and situation;
- recognition and accreditation of your previous learning.

In addition, as a student on the programme you will have:

- access to university learning resources, which include engineering subject specific resources;
- supervisory support throughout the course.

The Learning Contract offers a mechanism that allows you to use your activities at work to improve your skills and knowledge in order to complete a higher degree programme and potentially meet PEI requirements. An additional potential benefit is knowledge exchange for your employer. Companies need to innovate, but often cannot afford the necessary specialist skills or resources. This programme creates the means by which knowledge can be exchanged between universities and industry, and a company can develop staff in key areas without them spending periods away from work.

The work-based Learning Contract and the associated evidence of learning and professional development form the basis of a submission for the PEI's Professional Review, which is the process of becoming a Chartered Engineer. It is important to emphasise that, as for all candidates for professional review, that the University cannot guarantee you professional registration, even if you are awarded an MSc. What the programme does offer however is an accredited process of committed, step-by-step help throughout, a work-friendly means of achieving additional learning and a way of having competences assessed en route to your Professional Review and Interview.

The MSc in Professional Engineering is dependent on the HEI process running alongside the PEI process.

Programme Aims

The specific aims of this programme are:

1. To provide you with an academically rigorous and challenging programme of study in key aspects of advanced learning in engineering, developed through a focus on environmental and technological issues;
2. To provide you with a programme of study that meets externally prescribed requirements for the Engineering Council to allow you to meet engineering institutions requirements for chartered engineering status;
3. To provide you with a programme of study that will meet the training needs of local, regional and international employers by focussing on real-world situations including a strong element of work based learning;
4. To provide staged learning opportunities, and provide you with the knowledge, skills and awareness to enable you to progress further academically in engineering and to contribute effectively in achieving sustainable environment;
5. To furnish you with scholarly writing, research, critical thinking, independent learning, communication, technical, problem solving and other transferable skills, enabling you to engage with continued professional development and further advanced study in the disciplines of engineering;
6. To facilitate study in the discipline by students from as broad a background and experience as possible, so that you will be able to contribute effectively to the planning and overall management of complex and multidisciplinary engineering projects.

SECTION THREE: PROGRAMME LEARNING OUTCOMES

The programme learning outcomes described below are comprehensive in nature and effectively integrate both higher education skills and career management skills with industry-specific technical knowledge. These learning outcomes are mapped individual modules within the programme as shown in **Appendix 1**.

Generic Learning Outcomes

When you have completed the MSc you should have gained:

1. Systematic understanding of the knowledge base and a critical awareness of current problems and developments at the forefront of the engineering discipline and in particular within the areas of professional practice of engineering.
2. A comprehensive understanding of research techniques and enquiry methods and be able to apply advanced knowledge and practice in an original manner to the solution of complex situations within the engineering discipline in particular within the areas of professional practice in engineering.
3. Conceptual understanding that enables you to:
 - critically evaluate current research and advanced scholarship in the discipline; and
 - evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses.
4. Deal with complex technical issues systematically, systemically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences.
5. Demonstrate self-direction and originality in tackling and solving engineering problems, and be able to act autonomously in planning and implementing tasks at a professional level.
6. To have the commitment and enthusiasm to continue to advance their knowledge and understanding of the engineering discipline, and to develop new skills to a high level for continuing professional development.
7. The qualities and transferable skills necessary for employment within the engineering profession requiring:
 - the exercise of initiative and personal responsibility.
 - decision-making in complex and unpredictable situations.

The Programme Specific Learning Outcomes for the **MSc Professional Engineering** programme are listed below:

Knowledge and Understanding of:

1. The scientific principles of the students chosen engineering discipline to an advanced level beyond undergraduate study.
2. Mathematical and computer models relevant to engineer to a comprehensive level and an appreciation of their limitations.
3. Management and business practices and their limitations as applied to strategic and tactical issues as appropriate for Chartered Engineers.
4. Problem solving methods, application, management and strategic usage.
5. Environmental awareness and strategic importance of environmental issues.

Intellectual Skills – the ability to:

1. Use fundamental knowledge to investigate new technologies.
2. Apply advanced mathematical and computer based models for solving complex problems in engineering, and the ability to assess the limitations of particular cases.
3. Extract data pertinent to an unfamiliar problem, and effect solutions using computer based engineering tools when appropriate.
4. Debate contemporary issues in engineering.
5. Critically discuss the importance of engineering on a global scale.

Practical/Subject Specific Skills – the ability to:

1. Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations.
2. Generate ground-breaking designs for products, systems, or components.
3. Evaluate the impact of regulatory, commercial and environmental constraints on processes and products.
4. Design and develop an economic and efficient materials handling system.

Transferable Skills – the ability to:

1. Explore professional development opportunities at Chartered Engineer level.
2. Display resourceful solutions to the limitations of current engineering practice.
3. Apply extensive knowledge and understanding of a wide range of engineering materials and components.
4. Critically identify an engineering problem at the design stage.
5. Critically apply advanced engineering tools to a variety of situations.

QAA/Professional Benchmarks

The requirements for registration as a Chartered Engineer (CEng) in the UK are produced by the Engineering Council in the UK Standard for Professional Engineering Competence (UK-SPEC 2013). UK-SPEC states that accreditation of engineering programmes are based on the consideration of a range of indicators at the appropriate level; EngTech, IEng, CEng.

The following learning outcomes were taken from UKSPEC 2010 and have been used to form the programme learning outcomes above. They are here for reference as you will need to map your studies and experience to these in preparing for an application to become a chartered engineer.

Appendix 2 shows how these learning outcomes map onto the modules you will study.

1. General Learning Outcomes

- The ability to develop, monitor and update a plan, to reflect a changing operating environment.
- The ability to monitor and adjust a personal programme of work on an on-going basis, and to learn independently.
- The ability to exercise initiative and personnel responsibility, which may be as a team member or leader.
- The ability to learn new theories, concepts, methods etc. and apply these in unfamiliar situations.

2. Specific Learning Outcomes

In respect of the specific learning outcomes, Masters degree graduates will also be characterised **by some or all of the following** (the balance will vary according to the nature and aims of each programme).

2.1 Underpinning Science and Mathematics, etc.

- A comprehensive understanding of the relevant scientific principles of the specialisation.
- A critical awareness of current problems and/or new insights, much of which is at, or informed by the forefront of the specialisation.
- An understanding of concepts relevant to the discipline, some from outside engineering, and the ability to critically evaluate and apply them effectively.

2.2 Engineering Analysis

- The ability to use fundamental knowledge to investigate new and emerging technologies.
- The ability to apply appropriate models for solving problems in engineering, and the ability to assess the limitations of particular cases.
- The ability to collect and analysis research data and use appropriate engineering tools to tackle unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of engineering analytical methods.

2.3 Design

- The ability to apply original thought to the development of practical solutions for products, systems, components or process.

2.4 Economic, Social and Environmental Context

- Knowledge and understanding of management and business practices, and their limitations, and how these may be applied appropriately, in the context of particular specialisation.
- The ability to make general evaluations of risk through some understanding of the basis of such risk.

2.5 Engineering Practice

- A thorough understanding of current practice and its limitations, and some appreciation of likely new developments.
- Advanced level knowledge and understanding of a wide range of engineering materials and components.
- The ability to apply engineering techniques taking account of a range of commercial and industrial constraints.

SECTION FOUR: PROGRAMME STRUCTURE

Structure and Curriculum

The programme is studied on a part-time basis with students able to study either on campus and the work-place, or online and the work-place.

For campus and work-place provision there is a flexible start date for the preparation towards the Personal Development Audit (PDA), but with two start dates for the MSc enrolment; these being September and January.

For online and work-place provision start dates for the preparation towards the Personal Development Audit (PDA) and MSc enrolment are September, January and May.

Personal Development Audit (PDA)

The course starts with the Negotiated Advanced Technical Module, and the Personal Development Audit (PDA) module which is a reflective examination and assessment of your education, qualifications, experience and competences upon enrolment and will identify any specific support requirements. The PDA is used to map the students experience against the requirements of UKSPEC and the chosen Professional Engineering Institution of the student. This will identify the gaps in knowledge and experience that the student needs to fill for professional registration.

The completion of the PDA will be used to develop the student's Learning Contract. When you enter a postgraduate programme you are eligible to apply for advanced standing in Recognition of Prior Learning (RPL) achievements providing that your learning has not already contributed to an awarded higher degree. Standard [University RPL regulations](#) will apply.

At the Entry Gateway you will be helped to assess your prior learning and experience in order to identify possible modules for RPL. It is envisaged that the majority of students will be able to identify some modules for RPL.

The programme consists of a combination of core and optional modules. The optional modules will be determined in the Learning Contract as they will be tailored to your requirements for gaining chartered status with your chosen institution. You will complete the Learning Contract as part of the first module and this sets out what learning goals are to be achieved and modules to be successfully completed and how achievements in the form of competences are to be evidenced for the PEI. It is developed together by you as an employee, an academic supervisor and professional supervisor. Involvement of your employer is key as they need to confirm that they will be able to provide you with appropriate and sufficient experience.

This postgraduate qualification enables working professionals a work-based learning route to obtaining Chartered Engineering (CEng) status. The WBL approach generates company-specific knowledge, experience and responsibility that provides additional learning, knowledge application and skill-sets. In short, it enhances underpinning knowledge and competences for the individual. The Learning Contract provides a framework that enables the learning experience to be tailored specifically around work and the requirements of a PEI.

Once you have completed the Learning Contract the programme will progress as a work based MSc.

Study Pattern: Campus

For campus based provision, students will study one or two modules a semester.

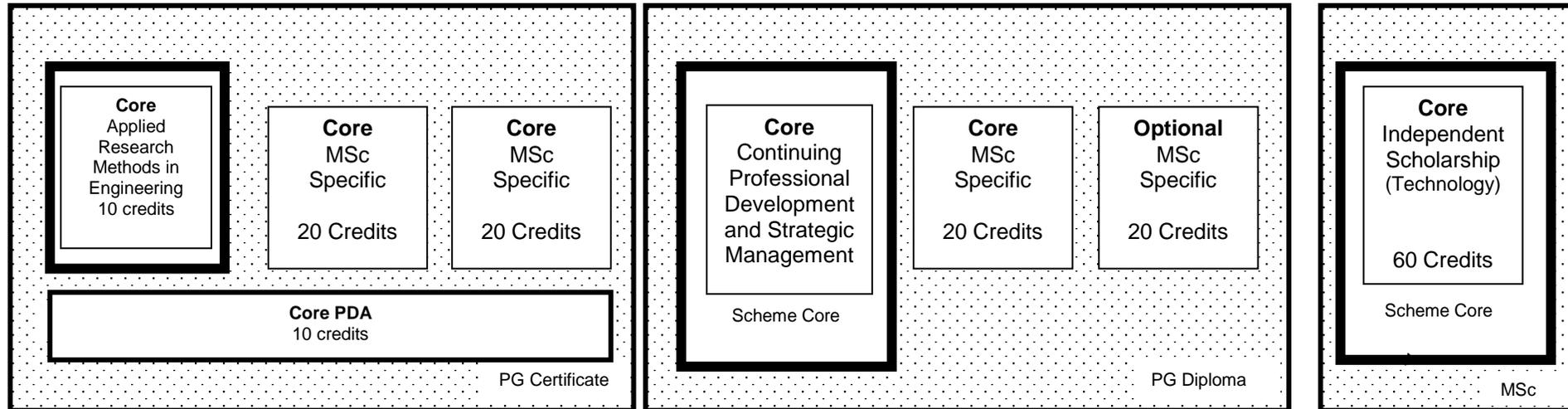
Study Pattern: Online

The study pattern for online students varies to the full time model. This is to allow flexibility for the delivery pattern and due to the work based nature of the programme enable you to negotiate projects. To enable you to have the time to successfully complete such assignments, some modules are delivered over two trimesters. A sample study pattern for students studying 20 credits a trimester, starting in the autumn, is below:

Trimester	Module
Autumn (T1)	Applied Research Methods in Engineering Personal Development Audit (PDA)
Spring (T2)	Negotiated Advanced Technical Module
Summer (T3)	Continuing Professional Development and Strategic Management
Autumn (T1)	Negotiated Technical Module (Environmental and Ethical Responsibility) Negotiated Technical Module (Commercial and Technical Leadership)
Spring (T2)	Negotiated Technical Module (Commercial and Technical Leadership)
Summer (T3)	Negotiated Technical Module (Problem Solving and Innovation in Technology)
Autumn (T1)	Independent Scholarship (Technology)
Spring (T2)	Independent Scholarship (Technology)
Summer (T3)	Independent Scholarship (Technology)

There will also be an accelerated route available for students who wish to study at a faster pace.

MSc Professional Engineering



The diagram above shows the MSc Framework for the College of Engineering and Technology. The MSc Professional Engineering has the following modules:

Core MSc Specific Modules (PG Certificate)

Negotiated Technical Module (Environmental and Ethical Responsibility)
 Negotiated Advanced Technical Module

Core MSc Specific Module (PG Diploma)

Negotiated Technical Module (Commercial and Technical Leadership)

Optional MSc Specific Modules (PG Diploma)

Negotiated Technical Module (Solving Engineering Problems)
 Negotiated Technical Module (Innovation and Technology)
 Negotiated Technical Module (Problem Solving and Innovation in Technology)

*Student prepared for
Exit Gateway*

Personal Development Planning

Personal development planning is an integral part of MSc Professional Engineering programme for every student. This course has been designed only for students who are employed within engineering based companies, it is essentially work-based and often sponsored by the student's company. It is based on the principle of learning whilst they are employed. Therefore the PDP element will be centered around the personal development you must undertake to obtain the professional qualification of CEng.

For this programme we have also acknowledged the Higher Education Academy (HEA) (2012) definition of Personal Development Planning.

PDP is defined as 'a structured and supported process undertaken by an individual to reflect upon their own learning, performance and/or achievement and to plan for their personal, educational and career development'.

PDP embraces a range of approaches to learning that connect planning (an individual's goals and intentions for learning or achievement), doing (aligning actions to intentions), recording (thoughts, ideas, experiences, in order to understand and evidence the process and results of learning) and reflection (reviewing and evaluating experiences and the results of learning).

The MSc is achieved through three phases described in Section 1. The Personal Development Audit (PDA), which is completed at the start of the programme is a reflective summary of your education, qualifications, experience and competences to date and allows you to plan your objectives in the personal development plan for the programme.

The Learning Contract which is generated from the PDA and reviewed as the programme is studied is a work plan of how you can gain knowledge and competence whilst meeting company objectives. It is written in the form of a sequenced professional development plan linked to the company's activities. This will form the basis of the PDP activities such as reflection and career development planning.

The Learning Contract is designed to be a live document to raise you to the required levels of underpinning knowledge, understanding and skill sets, as mapped against UK-SPEC threshold competences. This ensures that these competences are met by you as you become a candidate for CEng registration. It also ensures that you, your tutors and reviewers from the PEI understand:

- what additional learning takes place and what credits are awarded;
- how it is to be achieved and assessed;
- how the activities meet the competence statements, and
- the estimated date of achievement when you can reasonably expect to be successful, subject to completion of the intended learning outcomes.

Alongside the Learning Contract, there will be completion of a competence mapping document and/or completion of any Professional Engineering Institution's (PEI) specific professional development records and will include a requirement for a reflective curriculum vitae. You will also need to be aware of any specific additional requirements of your intended PEI, know how to achieve registration and know that step-by-step help is available for them to access.

The module CPD and Strategic Management is a core module for the Postgraduate Diploma for all students and is designed to develop your managerial skills in preparation for work in a global industry environment. The CPD (Continuing Professional Development) element

allows you to contextualise and concentrate your studies in your own discipline adding to employability and career development in the work place.

PDP elements are also integrated throughout the programme by:

- access for online students to a skills diagnosis opportunity at the beginning of your programme. From this you will be directed to a range of resources to help you to develop your own competencies. Link: <https://udol-induction-diagnostics.derby.ac.uk/udol-induction-diagnostics/start/index.php> Campus based students are also welcome to access the skills diagnosis.
- The use of a microsite called 'Personal Development Planning for the Digital Age'. This microsite will contain a range of learning objects that address digital literacy, digital scholarship and graduate employment skills, all of these skills being considered transferable - from study to employment and vice versa. The learning materials can be used in several ways:
 - You may be directed to carry out tasks which have been written into the authored materials.
 - Your tutor may request or advise you to study specific skills to improve your understanding of a work related concept, develop a specific digital literacy or enhance a specific scholarship skill. Your tutor will look for the development of these skills within the module.
 - You may proactively engage with the microsite to develop the skills independently.

Part of the requirement of the MSc is employer support, which usually includes a named company superior who will advise you on your PDP activities.

SECTION FIVE: PROGRAMME DELIVERY

Learning, Teaching and Assessment

The MSc Professional Engineering is a four way advanced work-based learning programme involving you as the student, academic staff at the University, a representative from the appropriate professional institution and an Industrial Supervisor (normally your line manager or training manager). The programme relies on engagement with academic staff; to plan your programme of study, engage with learning activities such as presentations and viva voce examinations (campus and virtual). It will also require attendance at the appropriate professional engineering institution for the Exit Gateway.

A common theme of the feedback received from our present employers is the need to develop the next generation of higher level managers. Such personnel, in order to progress and develop, require a strong understanding of the complex multidisciplinary issues inherent in contemporary engineering, whilst also appreciating the wider picture of the legislative and operational environments that companies work in.

A variety of teaching and learning strategies will therefore be employed in accordance with University of Derby's Learning and Teaching Strategy and the needs of the professional bodies. The teaching and learning strategies have been informed by the consultancy process and the active involvement of the programme development team. The programme has been designed around two core modules which are available to all students by distance (online) learning.

For campus based students, Continuing Professional Development and Strategic Management is also available through conventional study at the University. Online students will engage with these modules through distance learning.

Independent Scholarship will be supported either conventionally through supervisory meetings or if you are studying at a distance through the University's Virtual Learning Environment (VLE), Blackboard.

The other modules on the programme are negotiated with the stakeholders above to meet the learning outcomes of the programme and the Output Standards for CEng. Modules can therefore be based wholly within your workplace or they may use the academic content of suitable taught modules, within the pool of modules delivered on campus by the College of Engineering and Technology, to supply the underpinning knowledge and understanding to complete a work-based project under supervision from the taught module leader. Online students will be able to access a pool of option modules offered by the University of Derby Online Learning. It is recognised that the planning of the Learning Contract will be a significant piece of work and the formulation of the learning strategy will form part of the final documentation.

The principles in the Learning and Teaching Strategy 2012 concerning the requirement of flexibility in programme design, curriculum, delivery mode and assessment form the basis for the whole programme.

For online learners, this programme is underpinned by the University of Derby Online Learning's Academic Framework. This framework outlines the teaching and learning approach taken within modules delivered through the online mode. Modules within the MSc Professional Engineering use the "Self-paced, Supported Online Learning" learning design, the "Collaborative Online Learning" design and the "Reflective Online Learning" design.

The key features of self-paced, supported online learning are:

- You can work through the module at your own pace, with a tutor and peer group to call on for support, with a set of optional tasks to undertake to support your learning

and with explicitly identified formative assessment activities about which you receive online feedback and guidance from your online tutor.

- You are provided with a set number of units of learning content. Content can be textual; can include video and audio material, screencasts or presentations with voiceovers.
- Each unit of content contains optional tasks for you to undertake to apply or 'process' the content. These activities will include suggestions for postings you could make in the community space for the module.
- Each module contains explicitly identified formative assessment activity that you can undertake and for which you can expect to receive feedback from your tutor.
- You may be provided with the opportunity to participate in a set number of live classroom sessions during the module (and recordings of these sessions will be made available to everyone on the module).

The key features of collaborative online learning are:

- At a set point or points within the module, you are required to participate in online collaborative activity with a small group of your peers which contributes towards your final assessment for the module.
- A primary responsibility of the tutor will be to facilitate the assessed collaborative activity.
- The collaborative activity will take place within a private space for each group within the module's 'Community space' on Blackboard.
- You are provided with a set number of units of learning content. Content can be textual; can include video and audio material, screencasts or presentations with voiceovers.
- Some of the units of content contain optional tasks for you to undertake to apply or 'process' the content.
- There will be a community space / discussion area for the module which is the primary space for you to receive support from tutors and peers.
- The community space / discussion area will be lead and managed by online tutors.
- You may be provided with the opportunity to participate in a set number of live classroom sessions during the module (and recordings of these sessions will be made available to everyone on the module).

The key features of reflective online learning are:

- As you work through the module, you are set activities that require you to contribute to a 'portfolio' of work or continuous reflections which contribute to your final assessment for the module.
- The portfolio or collection of reflections (which may be a blog or journal) can be used to assess knowledge, to assess reflective skills (such as analysis, synthesis or evaluation, often higher level skills) or to assess development over a period of time.
- You are provided with a set number of units of learning content. Content can be textual; can include video and audio material, presentations with voiceovers.
- There will be a community space / discussion area for the module which is the primary space for you to receive support from tutors and peers.
- The community space / discussion area will be lead and managed by online tutors.
- A primary responsibility of the tutor will be to facilitate and provide formative feedback on the production and development of your portfolio of work.
- You may be provided with the opportunity to participate in a set number of live classroom sessions during the module (and recordings of these sessions will be made available to everyone on the module).

A common approach is for regular activities to be set based on the content of an online unit and then you are provided with the opportunity to discuss this work in online discussions. Feedback may be in groups or to you individually.

More detail on the University of Derby Online Learning's Academic Framework (which has been approved by the University's Academic Board) can be found at:
<http://www.derbyonlinelearning.co.uk/content1.asp?MenuID=3641&courseId=UDO7714>

Research and project work is an essential part of an MSc programme as in stage three of the programme you will be asked to carry out a substantial research project. Full guidance on research techniques is part of the programme and they will build on your experience when they enter the programme.

All students are required to comply with research governance and ethics principles whilst undertaking their programme of study. This is of particular importance when conducting research involving other people. Information on these principles can be found on the University web site at www.derby.ac.uk/research/ethics

You are also required to ensure that you have ethical permission in place from your place of work and comply with any national or International standards.

Sharing, developing and reflecting on learning with other students and with staff is an important part of achieving your potential in postgraduate study. Online students will have access to forums, as will campus based students who will be able to engage with an online postgraduate learning forum, where students can share ideas and experiences and reflect on their modules or programme design. Campus and online students will also have several opportunities during the year for face-to-face discussion or online tutorials with academic staff.

You should recognise different types of learning in your programme, and should be able to look for the interconnections between you study. You will be introduced to the following concepts:

- Knowledge relates to acquisition of interrelated concepts, facts and laws related to engineering.
- Intellectual skills relates to the ability to process advanced knowledge and information, being able to make deductions and form conclusions in which you have confidence.
- Practical skills cover a whole range of skills including computer modelling, design and manufacturing skills, as well as work-based skills.
- Transferable skills are those which may be taken into other fields of activity. They are diverse, but include the ability to use advanced quantitative methods, to communicate well in a variety of ways, to work in a team, to work with computers, and to manage other people, processes or organisations.

For every module learning outcome, there is some form of assessment. This is to allow you to demonstrate that you have achieved that learning outcome. They are accordingly as diverse as the learning outcomes themselves. Assessments will be both formative and summative. Formative assessments are used to give you feedback to inform you on your progress and learning. Summative assessment is used to assess performance in a learning outcome, however most summative assessments normally contain feedback and so contribute towards learning.

The negotiated work based modules will have an academic supervisor from the University of Derby and an Industrial supervisor. The academic supervisor will have the overall responsibility for the provision and delivery of the relevant teaching and learning material for the module and will also be solely responsible for the final marking of the assessments associated with the module. The Industrial Supervisor will be a mutually agreed person at your workplace who is deemed capable of providing you with appropriate advice and guidance as necessary to assist you in the understanding and completion of your work

based learning. The Industrial Supervisor will be able to provide feedback on your performance and participation in the WBL aspects of the module to the academic, but will not be formally involved in the marking of the assessments for the module.

Students with Additional Needs

The University is committed to ensuring that all students engaged on a programme have equal opportunity to succeed. Students experiencing difficulty or who have specific needs will be advised to use the University Central Support systems.

Campus based students can seek additional support through the Student Centres. Online students can seek additional support on pastoral issues through their Online Learner Advisor.

University admissions policy requires competence in the English language (see Section Six). It is not envisaged that students from different cultural backgrounds will be disadvantaged in any way by the learning, teaching and assessment strategy outlined, provided the language requirement is satisfied.

Project Work

The Independent Scholarship module is an essential component of an MSc programme. It provides a major opportunity for students to demonstrate their skills and knowledge acquired in the programme. In addition to the application of subject specific skills, and general skills such as critical analysis, objective evaluation, problem solving, formulating and testing hypotheses, students will be expected to display innovative, creative thinking and organisational skills.

Academic Writing

As a university student you are expected to follow academic writing standards. You will receive guidance on [study skills](#), including how to ensure you do not carry out an [academic offence](#).

Assessment

A mixture of formative and summative assessment will be employed with a strong commitment to deep learning. The assessment strategy aims, on a formative level, to enable you to continuously develop your development towards their registration to CEng. The more formative assessment plays an important role in all modules to enable you to reach the learning outcomes of the module. It is particularly important in negotiated modules as these modules do not have such a conventionally structured approach as taught modules.

Assessment may take many forms: for example written work, presentations, contributions to online discussions, computer aided drawings, laboratory assessments, in-company interviews and/or viva voce. Many assessments, including the MSc project, require a written report to describe the work done. The ability to produce professionally written reports is an important output of the programme. Some modules are assessed through coursework only, others by a combination of coursework, assignments, case studies, oral and graphic presentations, collaborative and interdisciplinary team work projects. This provides a flexible and effective means of assessing progress. The nature of the assessment is based on the module and subject area, as well as the requirement of the professional bodies for CEng registration.

Assessments are designed to enable demonstration of learning outcomes and up to two different assessment components may be ascribed to a module. It is a fundamental principle that coursework must be undertaken not just for assessment purposes, but as a central part of the learning strategy for the module.

The term coursework also includes project work. Project work will be an individual's work and is distinguished by the emphasis on problem solving and proposed appropriate solutions to specific problems. The questioning style can include essay questions, multiple choice questions, or problem solving questions.

Precise assessment requirements, together with specific assessment criteria are issued to students in module handbooks at the commencement of conventionally taught modules. In the case of a negotiated module the assessment is designed at the negotiation stage. Thus, a mixture of formative and summative assessment is proposed, with a strong commitment to deep learning and an assessment strategy that, on a formative level, will continuously develop independent learning throughout the programme.

PDA:-The PDA determines how you will meet the learning outcomes of the programme; this is achieved by enabling you to use the PDA to map your intended path through the MSc against UKSPEC, which is also the criterion used to map against the MSc requirements.

SECTION SIX: ADMISSIONS

Entry Criteria

Although this programme is academically demanding it is important that students entering have an enthusiastic attitude to their programme of study and a passion for engineering in general. We are seeking to attract well-motivated students who wish to pursue their studies and further professional development in a stimulating and vocationally orientated learning environment.

You should normally have achieved:

- A degree or equivalent in an engineering related discipline.

The course is normally for students who have:

- BEng (Hons) degree which is accredited for either IEng or as part of CEng.
- The equivalent of the above through significant work experience.
- Are working in a relevant industry to enable them to study the appropriate technical content for accreditation.

In addition, you may also be able to gain advanced entry to Level 7 based on the evidence of other certified qualifications and experiential learning. In this case, Recognition of Prior Learning (RPL) may be possible. Whilst the University guidelines on prior learning will be followed, RPL will only be recommended where applicants can present a portfolio of professional work, deemed to be of an appropriate level.

Students will be expected to adhere to the University of Derby Equality and Diversity policy and will be required to sign up to the University Professional Conduct and Suitability policy.

International / European Students

Entry criteria:

For international students, normally your qualification will need to be mapped to the UK equivalent registration to ensure that you are entering the programme with at least 120 academic credits at level 6.

It is essential that on application you submit the following:

- a) Qualification evidence awarded in your country
- b) Transcripts of all relevant education/training
- d) International English Language Testing System (IELTS) with a score of 6 in all areas.

IELTS: <http://www.ielts.org/default.aspx>

SECTION SEVEN: STUDENT SUPPORT AND GUIDANCE

Preparation and Induction

Induction will be an important part of the MSc Professional Engineering programme. It is planned for enrolment onto the programme at, for campus programmes, two points in the year, September and January; and for online programmes three points in the year, September, January and May. However, before you enter the programme you must fully understand the programme's aims and operation in order to be able to prepare for your selection of a suitable PEI, the Personal Development Assessment (PDA) for the *Entry Gateway* and the Learning Contract. Factors which need to be taken into account are whether you are studying the campus based programme or studying online. Induction will provide, in addition to the normal guidance on studying at the University, guidance on matters such as selection of a suitable Professional Engineering Institution to work with towards CEng registration, how the negotiated module works for you individually, communications and support process for you and tools and techniques for studying at MSc level.

It is important that you feel part of a post graduate learning community, even though you may not be attending formal lectures or be studying near to the University.

For online learners there is an Online Orientation to the online learning environment and self-paced, online study.

There will be opportunities for you to take part in formal feedback mechanisms within the University either by becoming a student representative at Programme Committees or through University and Programme evaluation questionnaires. Online students can provide feedback through virtual attendance at Programme Committees and through the completion of online module evaluation questionnaires. This feedback is then fed forward through appropriate means by the academic lead of the programme on your behalf. You will then be provided with feedback regarding any decisions or actions that have been taken to address any issues that you may have raised. We will value your comments and input as part of our formal annual monitoring processes.

Welfare and Pastoral Support

Your welfare and pastoral support is primarily the responsibility of the Programme Leader (campus) or Academic Lead (online).

Campus based students have access to a Student Liaison Officer and online students have access to an Online Learner Advisor. The University offers a range of support and advisory services for you to access. Most services are accessible on campus or remotely.

More information for campus based students visit [Student Wellbeing Service](#).

Online students can access support through their [Online Learner Advisor](#).

Programme Leadership

The Programme Leader (Academic Lead – online) is responsible for the day-to-day management of the programme. This includes the development of the PDA's and Learning Plans. The programme leader will liaise with the module leaders and the industrial supervisors. The programme leader will also monitor student performance and progress

Module leaders (Associate Academic – online) will be responsible for coordinating the delivery of the module. This will include advising students on work-based projects, determining suitable work-based projects and assessing the complete projects. The role will also include liaising with the industrial supervisor to determine if the student is progressing the work well and the programme leader.

Industrial Supervisor will mentor the student and provide guidance in the identification and implementation of the work-based projects. The industrial supervisor will review the students work and help the student develop the body of evidence needed for professional registration.

Cessation of Studies

Due to the work-based nature of the programme it relies on the student being in suitable employment to complete their studies. The programme therefore has the contingency plan detailed below to cope with students who may lose their jobs.

In the first instance the student's situation will be assessed by the programme leader in order to determine a suitable course of action, which is likely to follow one of the courses of action outlined below.

- The student quickly finds another suitable job and continues with studies.
- The student is delayed in finding suitable employment but still wants to continue so studies are suspended for a period of time.
- The student wishes to continue on the programme but can't find employment, at this point attempts will be made to find some work-based learning opportunities through other employers using the programme.
- The student wishes to continue on a full time basis, at this point the student would be transferred to a suitable full time MSc within the College of Engineering and Technology, based in Derby.
- If none of the above solutions are suitable the student's studies will be terminated.

These options represent a selection of possible solutions to this issue.

SECTION EIGHT: POST PROGRAMME OPPORTUNITIES AND EMPLOYER LINKS

Post Programme Opportunities

Technological advances and complexity are increasing yearly for highly technological industries. The skills set for technicians, graduates, postgraduates and researchers entering employment and the CPD required to enable engineers to be at the cutting edge throughout their careers is becoming more interdisciplinary and demanding in terms of academic rigour and for technically qualified engineers to find innovative and effective solutions to complex risk situations and industrial problems.

The programme provides an ideal platform for you to develop and hone the skills needed above to progress your career in a technical or managerial area of the engineering industry by an affordable, work-based and supportive route. You will be able to demonstrate the necessary competences and underpinning knowledge, regardless of the size of your employer for career development. The clearly articulated progression route to becoming a chartered engineer gives you the professional status that you need to work in the industries above or fits you with the skills that you will need for further continued professional development.

The College of Engineering and Technology specialises in engineering programmes in civil, electrical and electronic, mechanical, manufacturing and motorsport and in technology programmes in product design, construction, architecture, live events and music. It has four research groups with two professors and three readers:

- Electrical, Electronic and Software Systems Research Group
- Creative Technologies Research Group
- Mechanical, Manufacturing Engineering and Industrial Design Research Group
- Built Environment Research Group

The breadth and depth of technological expertise in the College, as well as our experience of educating Derby students from companies all around the region, will enable you to progress onto a campus based supervised MPhil and PhD at the University tailored to your professional needs and interests.

You can access career development support through the [Careers Employment Service](#).

Employer Links

The College of Engineering and Technology, through their established MSc and engineering honours degree awards, has developed a number of strong links within the engineering industry in Derby and the surrounding East Midlands who have provided valuable input into the programme structure and design during the consultation process. An additional factor in the MSc Professional Engineering is that the programme has had input from the Engineering Council and the HE STEM programme.

Derby is a multi-technological city with top international employers that include automotive, aerospace, rail, civil engineering, power generation and distribution and nuclear engineering. As a technological city with an industrialised hinterland, advanced level engineering skills are in demand for key companies such as Rolls Royce, Bombardier, Balfour Beatty, Toyota, JCB, Severn Trent, URS Scott Wilson, Jacobs with many small supporting companies involved in infrastructure, materials supply, technical consultancy and specialist testing. The College has many graduates working in these companies and others in the East Midlands and beyond and we have on-going relationships for their input into our programmes with their senior managers being part of our Industrial Liaison Committee.

Many of our programmes maintain ongoing liaison with employers through guest speakers, visits to companies and participation in industry events and exhibitions. Students also spend time in industry carrying out industrial projects and taking part in employer led competitions.

APPENDIX 1 MAPPING DOCUMENT

<p>Knowledge and Understanding On successful completion of the programme you will be able to:</p> <p>Module Title</p>	<p>The scientific principles of the students chosen engineering discipline to an advanced level beyond UG study.</p>	<p>Mathematical and computer models relevant to engineer to a comprehensive level and an appreciation of their limitations.</p>	<p>Management and business practices and their limitations as applied to strategic and tactical issues as appropriate for Chartered Engineers</p>	<p>Problem solving methods, application, management and strategic usage</p>	<p>Environmental awareness and strategic importance of environmental issues</p>
LEVEL 7					
Applied Research Methods in Engineering	√	√	√	√	√
Negotiated Technical Module (Solving Engineering Problems)	√	√			
Negotiated Technical Module (Innovation and Technology)	√	√		√	√
Professional Development Audit					
Continuing Professional Development and Strategic Management		√	√		
Negotiated Technical Module (Environmental and Ethical Responsibility)		√	√		√
Independent Scholarship (Technology)	√	√	√	√	√
Negotiated Advanced Technical Module	√	√			
Negotiated Technical Module (Commercial and Technical Leadership)			√		

Intellectual skills On successful completion of the programme you will be able to: Module Title	Use fundamental knowledge to investigate new technologies.	Apply advanced mathematical and computer based models for solving complex problems in engineering, and the ability to assess the limitations of particular cases.	Extract data pertinent to an unfamiliar problem, and effect solutions using computer based engineering tools when appropriate.	Debate contemporary issues in Engineering	Critically discuss the importance of Engineering on a global scale
LEVEL 7					
Applied Research Methods in Engineering	√	√	√		
Professional Development Audit			√	√	√
Negotiated Technical Module (Solving Engineering Problems)	√	√	√		
Negotiated Technical Module (Innovation and Technology)	√	√	√		
Continuing Professional Development and Strategic Management		√		√	√
Negotiated Technical Module (Environmental and Ethical Responsibility)		√		√	
Independent Scholarship (Technology)	√	√	√	√	√
Negotiated Advanced Technical Module			√		
Negotiated Technical Module (Commercial and Technical Leadership)				√	√

Practical/subject specific skills On successful completion of the programme you will be able to: Module Title	Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations	Generate ground-breaking designs for products, systems, or components	Evaluate the impact of regulatory, commercial and environmental constraints on processes and products.	Design and develop an economic and efficient materials handling system	Create web pages for data manipulation and analysis
LEVEL 7					
Applied Research Methods in Engineering	√	√		√	√
Professional Development Audit			√		
Negotiated Technical Module (Solving Engineering Problems)					
Negotiated Technical Module (Innovation and Technology)		√			√
Continuing Professional Development and Strategic Management		√	√		
Negotiated Technical Module (Environmental and Ethical Responsibility)		√	√		
Independent Scholarship (Technology)	√	√			
Negotiated Advanced Technical Module	√	√			
Negotiated Technical Module (Commercial and Technical Leadership)			√	√	

Transferable skills On successful completion of the programme you will be able to: Module Title	Explore professional development opportunities at Chartered Engineer level.	Display resourceful solutions to the limitations of current Engineering practice.	Apply extensive knowledge and understanding of a wide range of engineering materials and components.	Critically identify an engineering problem at the design stage	Critically apply advanced engineering tools to a variety of situations.
LEVEL 7					
Applied Research Methods in Engineering					√
Professional Development Audit	√				
Negotiated Technical Module (Solving Engineering Problems)			√		√
Negotiated Technical Module (Innovation and Technology)					√
Continuing Professional Development and Strategic Management	√				
Negotiated Technical Module (Environmental and Ethical Responsibility)		√			
Independent Scholarship (Technology)		√		√	
Negotiated Advanced Technical Module		√		√	√
Negotiated Technical Module (Commercial and Technical Leadership)	√	√			

APPENDIX 2: ENGINEERING COUNCIL MAPPING

MSc Professional Engineering	Level 7 Modules								
Area A Use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology	Applied Research Methods in Engineering	Professional Development Audit	Negotiated Technical Module (Environmental and Ethical Responsibility)	Negotiated Advanced Technical Module	Continuing Professional Development and Strategic Management	Negotiated Technical Module (Commercial and Technical Leadership)	Negotiated Technical Module (Solving Engineering Problems)	Negotiated Technical Module (Innovation and Technology)	Independent Scholarship (Technology)
Use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology.	√	√	√	√	√	√	√	√	√
Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology	√		√	√	√	√	√	√	√
Engage in the creative and innovative development of engineering technology and continuous improvement systems.	√	√	√	√	√	√	√	√	√

Area B Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.	Applied Research Methods in Engineering	Professional Development Audit	Negotiated Technical Module (Environmental and Ethical Responsibility)	Negotiated Advanced Technical Module	Continuing Professional Development and Strategic Management	Negotiated Technical Module (Commercial and Technical Leadership)	Negotiated Technical Module (Solving Engineering)	Negotiated Technical Module (Innovation and Technology)	Independent Scholarship (Technology)
Identify potential projects and opportunities.		√		√		√			√
Conduct appropriate research, and undertake design and development of engineering solutions.	√		√		√				√
Manage implementation of design solutions, and evaluate their effectiveness.	√		√			√	√		√

Area C Provide technical and commercial leadership.	Applied Research Methods in Engineering	Professional Development Audit	Negotiated Technical Module (Environmental and Ethical Responsibility)	Negotiated Advanced Technical Module	Continuing Professional Development and Strategic Management	Negotiated Technical Module (Commercial and Technical Leadership)	Negotiated Technical Module (Solving Engineering Problems)	Negotiated Technical Module (Innovation and Technology)	Independent Scholarship (Technology)
Plan for effective project implementation.	√	√		√	√	√	√		√
Plan, budget, organise, direct and control tasks, people and resources.				√			√		√
Lead teams and develop staff to meet changing technical and managerial needs.	√		√			√	√		√
Bring about continuous improvement through quality management.		√	√	√		√			√

Area D Demonstrate effective interpersonal skills.	Applied Research Methods in Engineering	Professional Development Audit	Negotiated Technical Module (Environmental and Ethical Responsibility)	Negotiated Advanced Technical Module	Continuing Professional Development and Strategic	Negotiated Technical Module (Commercial and Technical Leadership)	Negotiated Technical Module (Solving Engineering Problems)	Negotiated Technical Module (Innovation and Technology)	Independent Scholarship (Technology)
Communicate in English1 with others at all levels.		√	√	√			√	√	
Present and discuss proposals	√	√		√	√				√
Demonstrate personal and social skills.		√	√		√	√		√	

Area E Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment.	Applied Research Methods in Engineering	Professional Development Audit	Negotiated Technical Module (Environmental and Ethical Responsibility)	Negotiated Advanced Technical Module	Continuing Professional Development and Strategic	Negotiated Technical Module (Commercial and Technical Leadership)	Negotiated Technical Module (Solving Engineering Problems)	Negotiated Technical Module (Innovation and Technology)	Independent Scholarship (Technology)
Comply with relevant codes of conduct.		√							
Manage and apply safe systems of work.	√		√	√				√	
Undertake engineering activities in a way that contributes to sustainable development.				√			√	√	
Carry out and record CPD necessary to maintain and enhance competence in own area of practice		√		√	√	√		√	
Exercise responsibilities in an ethical manner.	√	√	√						√

APPENDIX 3:

The MSc PROFESSIONAL ENGINEERING PROCESS - MAP

