



UNIVERSITY OF LINCOLN

Programme Specification

Title:

Engineering Management

Final Award: **Master of Science (MSc)**

With Exit Awards at:

Postgraduate Certificate (PG Cert)

Postgraduate Diploma (PG Dip)

Master of Science (MSc)

To be delivered from: 19 Sep 2016

Level	Date
Masters or Postgraduate Certificate (PG Cert)	2017-18
Masters or Postgraduate Diploma (PG Dip)	2017-18
Masters or Master of Science (MSc)	2017-18

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1. Introduction

This document describes one of the University of Lincoln's programmes using the protocols required by the UK National Qualifications Framework as defined in the publication *QAA guidelines for preparing programme specifications*.

This programme operates under the policy and regulatory frameworks of the University of Lincoln.

2. Basic Programme Data

Final Award:	Master of Science (MSc)
Programme Title:	Engineering Management
Exit Awards and Titles	Postgraduate Certificate (PG Cert) Postgraduate Diploma (PG Dip) Master of Science (MSc)
Subject(s)	Engineering Management
Mode(s) of delivery	Full Time Part Time
Is there a Placement or Exchange?	No
UCAS code	
Awarding Body	University of Lincoln
Campus(es)	Lincoln Campus
School(s)	School of Engineering
Programme Leader	Richard Allarton (RichAllarton)
Relevant Subject Benchmark Statements	
Professional, Statutory or Regulatory Body Accreditation	
Programme Start Date	2017-18

3. Programme Description

3.1 Overview

The MSc Engineering Management degree is designed to build upon a prior engineering background and focus on enhancing managerial understanding in the engineering domain. This course aims to provide an extension beyond undergraduate study for those embarking, changing or advancing their chosen career, with an initial focus in the turbo-machinery domain.

Informed by the needs of industry, with a theme of sustainability, this degree will provide students with the opportunity to develop the strong communication skills and capabilities that employers are looking for in addition to leadership, negotiation and influencing, presentation and self-awareness skills.

Students will have the opportunity to study modules including energy fundamentals, finance, economics, energy systems, entrepreneurship and risk management. Delivered by both the Lincoln Business School and the School of Engineering, the programme maximises on the specialist knowledge within each School whilst ensuring both areas meld into a coherent delivery.

Teaching includes the use of real-life case studies, with the aim of enabling students to relate theory to practice across a range of business situations. Students will have the opportunity to take part in workshops led by business experts, visit companies to view current practices and engage in company based projects.

Optional modules will run as far as at least 10 students select them. Timetabling arrangements may limit the availability of modules to some students. As the options reflect staff's research interests, they may alter over time due to staff availability.

3.2 Aims and Objectives

The main aim of the MSc in Engineering Management is to take engineers and equip them to succeed in the 21st century. Combining both engineering and management skills, with a sustainability perspective and an energy theme it provides graduates with a rounded perspective and specific skills set required by modern industrial companies. The spread of topics provides an holistic taught delivery across 2 dedicated Schools, taking advantage of their excellent links with local and global industries to ensure that graduates of this MSc will not only be in demand by a wide spectrum of organizations, but will be critical thinkers and independent learners, ready to meet the challenges of modern power production. The programme aims to produce graduates who:

- Can systematically and creatively deal with complex issues in mechanical engineering, specifically control and power and energy, and make sound judgements;
- Can communicate effectively at either small meetings and negotiation situations or when presenting to large audiences
- have self-direction and originality in tackling and solving problems;
- act autonomously in planning and implementing tasks at a professional level;
- are well prepared for a career in mechanical engineering.

3.3 Variations to Standard Regulations and Guidance

None

4. Programme Outcomes

Programme-level learning outcomes are identified below.

Refer to *Appendix I – Curriculum Map* for details of how outcomes are deployed across the programme.

4.1 Knowledge and Understanding

On successful completion of this programme a student will have knowledge and understanding of:

- 1 the fundamental scientific and technical aspects of advanced mechanical engineering science, with focuses on power and sustainability.
- 2 topical issues in business and management informed by contemporary organisation research and practice.
- 3 the management and development of people and teams within organisations in an ethical and responsible way.
- 4 the limitations of current knowledge and the need to gain new knowledge through advanced scholarship and further study, research and team-based project work.

4.2 Subject Specific Intellectual Skills

On successful completion of this programme a student will be able to:

- 5 deal with complex issues both systematically and creatively, and make sound judgements in the absence of complete data.
- 6 demonstrate a systematic understanding of knowledge and a critical awareness of mechanical engineering and its management, with a focus on power and sustainability issues.
- 7 apply a conceptual understanding that enables evaluation of methodologies and the ability to propose new hypotheses.
- 8 synthesise and analyse information and ideas from a range of different types of information (including current research, technical manuals and standards) and apply creative and original thought in order to propose new solutions to complex and non-standard problems.
- 9 reflect on the behaviour of others and the self in organisational settings based on theories of psychology and leadership.

4.3 Subject Specific Practical Skills

On successful completion of this programme a student will be able to:

- 10 collect, record, analyse and critically interpret data.
- 11 demonstrate competence in using a range of techniques applicable to professional practice.
- 12 plan and conduct a scientific investigation using a wide range of technical and other literature: demonstrating practical laboratory skills associated with the relevant modules; and demonstrating skills in research planning, and execution and technical writing through

completion of the research project.

4.4 Transferable Skills and Attributes

On successful completion of this programme a student will be able to:

- 13 demonstrate effective independent learning and the ability to perform complex tasks to a high level.
- 14 apply a systematic approach to problem solving, demonstrating creativity and innovation.
- 15 demonstrate a high level of competency in the skills of analysis and critical evaluation.
- 16 plan, budget, organize, direct and control tasks, people and resources either individually or in collaboration with others and communicate at an advanced level to a variety of audiences.

For details of each module contributing to the programme, please consult the module specification document.

5. Learning, Teaching and Assessment Strategies

5.1. Learning and Teaching Strategy

Wherever possible, the School will make maximum use of industry-university links so that graduates will be immersed in modern commercial and managerial practices, able to experience, analyse and judge their value and applicability in differing work environments. In addition to traditional modes of delivery, workplace experience and industrial exposure is embedded within the programme through industry support. This includes industrial speakers, factory tours and engagement in practical engineering projects set by industrial collaborators, in-line with Student as Producer principles. In other words students will be engaged with, and have ownership over, the production of their own educational experience by working in collaboration with academics and key people from the industry. This industrially informed teaching has seen the School of Engineering presented with the Lord Stafford Award and become a Global Principal Partner with Siemens.

Formative assessment, in the form of problem based learning, underpins the taught sessions and is integral to effective learning, allowing students to assess and develop their own understanding in an individualised way to more fully meet their own personal learning needs and style, whilst being relevant to industrial practices. Students will be expected to engage in learning both within the taught sessions and via independent learning, set by the programme team. This will include on-line learning material that will form the theoretical underpinnings of the taught sessions. Blended forms of delivery will be prevalent, through the use of a Virtual Learning Environment and flipped learning, where the student will be expected to research on topics and deliver to their peers.

The practical nature of the modules subjects will develop an interest in key areas which can be followed through in to the project phase. In this way the student experience and Student as Producer concepts are to the fore, with clear notions of discovery, collaboration, engagement, production embedded in the approaches.

The availability of optional modules may vary from year to year and will be subject to minimum student numbers being achieved. This means that the availability of specific optional modules cannot be guaranteed. Optional module selection may also be affected by staff availability.

5.2. Assessment Strategy

A variety of assessment methods are utilised during this course, based primarily on open coursework, in which students are able to access appropriate resources. In this way, students not only demonstrate their level of understanding but display and develop a variety of workplace relevant skills, including: their time management and research skills, their information selection, evaluation and extrapolation and their ability to present through concise, pithy forms of report delivery. Students will be expected to display a high level of understanding of the fundamentals of their subjects, but also how to apply and extend these to advance understanding. On a meta level, it hones and tests their research and problem solving skills.

6. Programme Structure

The total number of credit points required for the achievement of Postgraduate Certificate (PG Cert) is 60.

The total number of credit points required for the achievement of Postgraduate Diploma (PG Dip) is 120.

The total number of credit points required for the achievement of Master of Science (MSc) is 180.

Level 4

Title	Credit Rating	Core / Optional
Research Methods for Banking, Finance and Economics 2017-18	15	Core

Masters

Title	Credit Rating	Core / Optional
Sustainable Energy Systems 2017-18	15	Core
Applied Thermo-fluids Systems 2017-18	15	Optional
Teams and Leadership 2017-18	15	Optional
Finance and accounting 2017-18	15	Optional
Decision Analysis for Managers 2017-18	15	Core
Procurement and Supply Chains 2017-18	15	Optional
Industrial Turbo-machinery 2017-18	15	Optional
Machines in Power Generation 2017-18	15	Core
Product Risk Analysis 2017-18	15	Optional
Combustion and Sustainable Fuels 2017-18	15	Optional
Project and Contract Risk Management 2017-18	15	Optional
Engineering Research Project 2017-18	60	Core

	PO13	PO14	PO15	PO16
Applied Thermo-fluids Systems 2017-18	✓	✓	✓	
Combustion and Sustainable Fuels 2017-18	✓	✓	✓	
Decision Analysis for Managers 2017-18	✓	✓	✓	✓
Engineering Research Project 2017-18	✓	✓	✓	✓
Finance and accounting 2017-18	✓	✓	✓	
Industrial Turbo-machinery 2017-18	✓	✓	✓	
Machines in Power Generation 2017-18	✓	✓	✓	
Procurement and Supply Chains 2017-18	✓		✓	✓
Product Risk Analysis 2017-18	✓	✓	✓	
Project and Contract Risk Management 2017-18	✓		✓	✓
Sustainable Energy Systems 2017-18	✓	✓	✓	
Teams and Leadership 2017-18	✓		✓	✓

Appendix II - Assessment Map

This table indicates the spread of assessment activity across the programme. Percentages indicate assessment weighting.

Level 4

	01	02	03	04	05	06	07	08	09	10	11	12
Research Methods for Banking, Finance and Economics 2017-18												
	13	14	15	16	17	18	19	20	21	22	23	24
Research Methods for Banking, Finance and Economics 2017-18												
	25	26	27	28	29	30	31	32	33	34	35	36
Research Methods for Banking, Finance and Economics 2017-18												
	37	38	39	40	41	42	43	44	45	46	47	48
Research Methods for Banking, Finance and Economics 2017-18			40				50	10				
							49	50	51	52	EP 1 (Wk 16)	EP 2 (Wks 33, 34, 35)
Research Methods for Banking, Finance and Economics 2017-18												

Masters

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	01	02	03	04	05	06	07	08	09	10	11	12
Applied Thermo-fluids Systems 2017-18												
Combustion and Sustainable Fuels 2017-18												
Decision Analysis for Managers 2017-18												
Engineering Research Project 2017-18												
Finance and accounting 2017-18							30					
Industrial Turbo-machinery 2017-18												
Machines in Power Generation 2017-18												
Procurement and Supply Chains 2017-18												
Product Risk Analysis 2017-18												
Project and Contract Risk Management 2017-18							30					
Sustainable Energy Systems 2017-18												
Teams and Leadership 2017-18												25

	13	14	15	16	17	18	19	20	21	22	23	24
Applied Thermo-fluids Systems 2017-18												
Combustion and Sustainable Fuels 2017-18												
Decision Analysis for Managers 2017-18												
Engineering Research Project 2017-18												
Finance and accounting 2017-18				70								
Industrial Turbo-machinery 2017-18												
Machines in Power Generation 2017-18								100				
Procurement and Supply Chains 2017-18				100								
Product Risk Analysis 2017-18												
Project and Contract Risk Management 2017-18					70							
Sustainable Energy Systems 2017-18												100
Teams and Leadership 2017-18	75											

	25	26	27	28	29	30	31	32	33	34	35	36
Applied Thermo-fluids Systems 2017-18		100										
Combustion and Sustainable Fuels 2017-18	100											

Decision Analysis for Managers 2017-18												
Engineering Research Project 2017-18												
Finance and accounting 2017-18												
Industrial Turbo-machinery 2017-18			100									
Machines in Power Generation 2017-18												
Procurement and Supply Chains 2017-18												
Product Risk Analysis 2017-18								100				
Project and Contract Risk Management 2017-18												
Sustainable Energy Systems 2017-18												
Teams and Leadership 2017-18												

	37	38	39	40	41	42	43	44	45	46	47	48
Applied Thermo-fluids Systems 2017-18												
Combustion and Sustainable Fuels 2017-18												
Decision Analysis for Managers 2017-18												
Engineering Research Project 2017-18												100
Finance and accounting 2017-18												
Industrial Turbo-machinery 2017-18												
Machines in Power Generation 2017-18												
Procurement and Supply Chains 2017-18												
Product Risk Analysis 2017-18												
Project and Contract Risk Management 2017-18												
Sustainable Energy Systems 2017-18												
Teams and Leadership 2017-18												

							49	50	51	52	EP 1 (Wk 16)	EP 2 (Wks 33, 34, 35)
Applied Thermo-fluids Systems 2017-18												

Combustion and Sustainable Fuels 2017-18						
Decision Analysis for Managers 2017-18					100	
Engineering Research Project 2017-18						
Finance and accounting 2017-18						
Industrial Turbo-machinery 2017-18						
Machines in Power Generation 2017-18						
Procurement and Supply Chains 2017-18						
Product Risk Analysis 2017-18						
Project and Contract Risk Management 2017-18						
Sustainable Energy Systems 2017-18						
Teams and Leadership 2017-18						

Appendix III - Benchmark Analysis

This table maps programme learning outcomes to relevant QAA subject benchmark statements or PSRB guidelines.

Knowledge and Understanding

	MDBM01	MDBM02	MDBM03	MDBM04	MDBM05	MDBM06	MDBM07	MDBM08	MDBM09
PO1				✓					
PO2	✓		✓						
PO3	✓								
PO4		✓							

	MDBM10	MDBM11	MDBM12	MDBM13	MDBM14	MDBM15	MDBM16	MDBM17	MDBM18
PO1									
PO2									
PO3									
PO4								✓	

	MDBM19	MEng01	MEng02	MEng03	MEng04	MEng05	MEng06	MEng07	MEng08
PO1		✓	✓						
PO2					✓				
PO3									
PO4	✓			✓		✓			✓

	MEng09	MEng10	MEng11	MEng12	MEng13	MEng14	MEng15	MEng16	MEng17
PO1		✓			✓			✓	
PO2						✓		✓	
PO3									
PO4							✓		

	MEng18	MEng19	MEng20	MEng21	MEng22	MEng23	MEng24	MEng25	MEng26
PO1									

PO2		✓							
PO3									
PO4			✓						
		MEng27	MEng28	MEng29	MEng30	MEng31	MEng32	MEng33	MEng34
PO1									
PO2									
PO3									
PO4									

Subject Specific Intellectual Skills

	MDBM01	MDBM02	MDBM03	MDBM04	MDBM05	MDBM06	MDBM07	MDBM08	MDBM09
PO5		✓							
PO6	✓						✓		
PO7			✓		✓				✓
PO8			✓		✓	✓		✓	
PO9									

	MDBM10	MDBM11	MDBM12	MDBM13	MDBM14	MDBM15	MDBM16	MDBM17	MDBM18
PO5			✓	✓			✓		
PO6					✓				
PO7			✓						
PO8			✓			✓		✓	
PO9		✓							

	MDBM19	MEng01	MEng02	MEng03	MEng04	MEng05	MEng06	MEng07	MEng08
PO5		✓				✓			✓
PO6					✓				
PO7					✓				✓
PO8				✓			✓	✓	

PO9									
	MEng09	MEng10	MEng11	MEng12	MEng13	MEng14	MEng15	MEng16	MEng17
PO5									
PO6		✓				✓			✓
PO7							✓		
PO8									
PO9									
	MEng18	MEng19	MEng20	MEng21	MEng22	MEng23	MEng24	MEng25	MEng26
PO5									
PO6									✓
PO7						✓			
PO8			✓	✓				✓	
PO9									
		MEng27	MEng28	MEng29	MEng30	MEng31	MEng32	MEng33	MEng34
PO5									
PO6									
PO7					✓				
PO8		✓				✓			
PO9									✓

Subject Specific Practical Skills

	MDBM01	MDBM02	MDBM03	MDBM04	MDBM05	MDBM06	MDBM07	MDBM08	MDBM09
PO10		✓				✓			✓
PO11		✓		✓	✓				
PO12									
	MDBM10	MDBM11	MDBM12	MDBM13	MDBM14	MDBM15	MDBM16	MDBM17	MDBM18

PO10									
PO11			✓						
PO12						✓	✓	✓	✓
	MDBM19	MEng01	MEng02	MEng03	MEng04	MEng05	MEng06	MEng07	MEng08
PO10									
PO11			✓	✓					
PO12	✓								
	MEng09	MEng10	MEng11	MEng12	MEng13	MEng14	MEng15	MEng16	MEng17
PO10									
PO11	✓	✓					✓		
PO12									
	MEng18	MEng19	MEng20	MEng21	MEng22	MEng23	MEng24	MEng25	MEng26
PO10				✓	✓				
PO11								✓	✓
PO12									
		MEng27	MEng28	MEng29	MEng30	MEng31	MEng32	MEng33	MEng34
PO10									
PO11					✓				
PO12							✓	✓	✓

Transferable Skills and Attributes

	MDBM01	MDBM02	MDBM03	MDBM04	MDBM05	MDBM06	MDBM07	MDBM08	MDBM09
PO13									✓
PO14									
PO15									
PO16									

	MDBM10	MDBM11	MDBM12	MDBM13	MDBM14	MDBM15	MDBM16	MDBM17	MDBM18
PO13									✓
PO14						✓		✓	✓
PO15				✓			✓	✓	
PO16	✓	✓					✓		✓
	MDBM19	MEng01	MEng02	MEng03	MEng04	MEng05	MEng06	MEng07	MEng08
PO13	✓								
PO14									
PO15									
PO16	✓								
	MEng09	MEng10	MEng11	MEng12	MEng13	MEng14	MEng15	MEng16	MEng17
PO13									
PO14									
PO15									
PO16									
	MEng18	MEng19	MEng20	MEng21	MEng22	MEng23	MEng24	MEng25	MEng26
PO13									
PO14									
PO15								✓	
PO16							✓		
		MEng27	MEng28	MEng29	MEng30	MEng31	MEng32	MEng33	MEng34
PO13		✓						✓	
PO14					✓				
PO15									
PO16							✓	✓	✓

Appendix IV: Benchmark Benchmark Statement(s)

MDBM01 - *Demonstrate a systematic understanding of relevant knowledge about organisations, their external context and how they are managed.*

MDBM02 - *Demonstrate application of relevant knowledge to a range of complex situations taking account of its relationship and interaction with other areas of the business or organisation.*

MDBM03 - *Demonstrate a critical awareness of current issues in business and management which is informed by leading edge research and practice in the field.*

MDBM04 - *Demonstrate an understanding of appropriate techniques sufficient to allow detailed investigation into relevant business and management issues.*

MDBM05 - *Demonstrate creativity in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to develop and interpret knowledge in business and management.*

MDBM06 - *Demonstrate ability to acquire and analyse data and information, to evaluate their relevance and validity, and to synthesise a range of information in the context of new situations.*

MDBM07 - *Able to evaluate the rigour and validity of published research and assess its relevance to new situations.*

MDBM08 - *Able to extrapolate from existing research and scholarship to identify new or revised approaches to practice.*

MDBM09 - *Ability to conduct research into business and management issues that requires familiarity with a range of business data, research sources and appropriate methodologies, and for such to inform the overall learning process.*

MDBM10 - *Ability to communicate effectively both orally and in writing, using a range of media.*

MDBM11 - *Able to operate effectively in a variety of team roles and take leadership roles, where appropriate.*

MDBM12 - *Able to consistently apply their knowledge and subject-specific and wider intellectual skills.*

MDBM13 - *Able to deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to a range of audiences.*

MDBM14 - *Able to be proactive in recognising the need for change and have the ability to manage change.*

MDBM15 - *Able to be adaptable, and show originality, insight, and critical and reflective abilities which can all be brought to bear upon problem situations.*

MDBM16 - *Able to make decisions in complex and unpredictable situations.*

MDBM17 - *Able to evaluate and integrate theory and practice in a wide range of situations.*

MDBM18 - *Able to be self-directed and able to act autonomously in planning and implementing projects at professional levels.*

MDBM19 - *Able to take responsibility for continuing to develop their own knowledge and skills.*

MEng01 - *A systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their academic discipline, field of study, or area of professional practice.*

MEng02 - *A comprehensive understanding of techniques applicable to their own research or advanced scholarship.*

MEng03 - *Originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline.*

MEng04 - *Conceptual understanding that enables the student. To evaluate critically current research and advanced scholarship in the discipline. And. To evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses*

MEng05 - *Able to deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences.*

MEng06 - *Demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level.*

MEng07 - *Continue to advance their knowledge and understanding, and to develop new skills to a high level.*

MEng08 - *The qualities and transferable skills necessary for employment requiring. The exercise of initiative and personal responsibility. Decision-making in complex and unpredictable situations ...*

MEng09 - *Have a comprehensive knowledge and understanding of mathematical models relevant to the engineering discipline, and an appreciation of their limitations.*

MEng10 - *Have a comprehensive understanding of the scientific principles of own specialisation and related disciplines.*

MEng11 - *Have a comprehensive knowledge and understanding of the role and limitations of ITC, and an awareness of developing technologies in ITC.*

MEng12 - *Have a wide knowledge and comprehensive understanding of the design process and the ability to apply and adapt the techniques in unfamiliar situations.*

MEng13 - *Have extensive knowledge and understanding of a wide range of engineering materials and components.*

MEng14 - *Have extensive knowledge and understanding of management and business practices, and their limitations, and can apply appropriately.*

MEng15 - *Have a thorough understanding of current practice and its limitations, and some appreciation of likely new developments.*

MEng16 - *Have an understanding of concepts from a range of areas including some outside engineering, and the ability to apply them effectively in technical and business decisions.*

MEng17 - *Have a comprehensive understanding of design methodologies related to their discipline and the ability to apply and adapt them in unfamiliar situations.*

MEng18 - *Have an understanding of the capabilities of computer based models for solving problems in engineering, and the ability to assess the limitations of particular cases.*

MEng19 - *Have the ability to make general evaluations of commercial risks through some understanding of the basis of such risks.*

MEng20 - *Able to use fundamental knowledge to investigate new and emerging technologies.*

MEng21 - *Able to extract, from given data, that which is pertinent to an unfamiliar problem, and apply in its solution, using computer based engineering tools when appropriate.*

MEng22 - *Able to select appropriate data from a range of possible data sets and present them in alternative forms to create deeper understanding and/or greater impact.*

MEng23 - *Able to generate an innovative design for systems, components or processes to fulfil new needs.*

MEng24 - *Able to integrate presentational techniques and the information to be presented for maximum impact.*

MEng25 - *Able to integrate knowledge of mathematics, science, information technology, design, business context and engineering practice to solve a substantial range of engineering problems, some of a complex nature, apply understanding to novel and...*

MEng26 - *Able to apply engineering techniques taking account of a range of commercial and industrial constraints.*

MEng27 - *Able to research and use new methods required for novel situations and adapt to specific purposes if necessary.*

MEng28 - *Able to recognise the capabilities and limitations of computer based methods for engineering problem solving, have some awareness of the future developments of IT tools, and formulate and anticipate needs.*

MEng29 - *Able to learn new theories, concepts, methods etc in an unfamiliar situation outside the discipline area.*

MEng30 - *Able to be innovative in the use of a broad range of scientific principles in solving engineering problems.*

MEng31 - *Able to generate ideas for new products and develop and evaluate a range of new solutions.*

MEng32 - *Able to develop, monitor and update a plan, to reflect a changing operating environment.*

MEng33 - *Able to monitor and adjust a personal programme of work on an on-going basis and can learn independently.*

MEng34 - *Able to undertake most of the technical roles within a team and can exercise leadership.*