



Programme Specification

ENG-IE-2020: Engineering (Industrial Engineering)

LU Bachelor of Engineering with Honours awarded by Lancaster University (FHEQ Level 6)

Programme Status: Approved | Version: 1

Introduction

This programme specification provides a summary of the main features of the Engineering (Industrial Engineering) programme and the learning outcomes that you as a student might reasonably be expected to achieve and demonstrate on successful completion of the programme.

Further detailed information related to this programme and the College can be found in the following resources:

- Programme Handbook
- B&FC Student Handbook
- B&FC Admissions Policy
- Work based and placement learning handbook (for foundation degrees)
- Student guide to assessment and feedback

Key Programme Information

Programme Code	ENG-IE-2020
Programme Title	Engineering (Industrial Engineering)
Teaching Institution	Blackpool and The Fylde College
Professional, Statutory and Regulatory Body (PSRB) Accreditation	None
UCAS Code	
Language of Study	English
Version	1
Approval Status	Approved
Approval Date	19 May 2020
JACS Code	Other: Other
Programme Leader	Margarita Georgieva

Programme Awards

Award	Award Type	Level	Awarding Body
LU Bachelor of Engineering with Honours	Honours Degree (360 credits)	Level 6	Lancaster University

Programme Overview

The need for engineers to maintain a flexible role in the workplace has evolved from simply having a detailed knowledge of engineering principles in fabrication, maintenance and product development, and design to a more rounded individual who is able to develop and manage systems across a whole range of technical and management disciplines.

Industrial Engineering is a very flexible and adaptable programme as it very often fills the margins between industry and business or management processes with a concern for human factors, improvement, ergonomics, customer satisfaction and quality. Industrial engineers can deal with optimisation of complex processes, systems and organisations, and possess the adequate technical engineering knowledge, while they also are knowledgeable in business development, operations management and project management practices. This makes graduates very flexible and more marketable in industry, and allows for the development of project and human resource management skills.

Industrial Engineering is one of the most flexible fields of Engineering that easily applies its principles to industries as well as businesses in view of increasing efficiency, reducing costs, improving quality of products and services. Industrial engineers optimise complex processes, organisations and systems or even create them to achieve higher efficiency by saving time, money or effort, and to monitor quality and increase productivity. The field overlaps with operations research, management science, ergonomics, and is a very human-oriented discipline which takes into account the human factor the viewpoint and motives of users at all levels.

Our BEng (Hons) Industrial Engineering programme is brand new and takes into account contemporary developments in the field. We will provide you with core engineering knowledge as a first step at Level 4. This is where you will learn foundational subjects such as engineering science, mathematics and design, along with professional engineering management. At Levels 5 and 6, you will start learning specialist topics which will give you more insight into the day-to-day work of an industrial engineer. Level 5 you will have practical subject areas such as lean manufacturing, industrial systems, control and simulation. You will also get a chance to work on your own projects and ideas and will get support and feedback all through your studies.

A continuous need for able industrial engineers on a global scale means there are excellent career opportunities for talented engineering graduates within a variety of sectors. The uniqueness of Industrial Engineering makes it adaptable to sectors across the industry and in the business world. The gender balance within the field is very favourable to women. There also are many professional organisations that you can join from day one and get support and guidance in your college and professional career. Many of our graduates are now employed by major companies such as EDF Energy, Westinghouse Springfields, BAE Systems, Airbus, NIC, GCE and Ford Motor Company as design, production, project or research and development engineers.

Admission Criteria

The entry criteria for Level 4 of the programme are:

- A minimum of 48 UCAS points from one of the following:
 - 2 A Levels (or equivalent), to include mathematics and a technology, engineering or science-based subject.
 - A National Certificate, Diploma or Extended Diploma (or equivalent) in a science or technology-based subject, including passes in mathematics.

The entry criteria for Level 5 of the programme are:

- HNC from B&FC for direct entry onto Level 5.
- HNC or HND, or Foundation Degree with an overall merit grade in Mechanical, General, Electrical/Electronic or Aeronautical Engineering, or another appropriate Engineering discipline through recognition of prior learning. Applicants are encouraged to apply as soon as possible to ensure timely processing of paperwork, and to investigate potential funding through the Student Loan Company if required.
- International qualification or qualification from other universities or colleges within the UK/EU might enable candidates to enter Level 5, subject to prior approval from the College's internal panel and Lancaster University.

Other Criteria

- If English is not the candidate's first language, an IELTS score of at least 6.0 with a minimum of 5.5 in all skills is also required.
- Applicants who are able to demonstrate relevant work experience or knowledge will also be considered on an individual basis and will be invited for an interview to determine suitability.
- Applicants with any other qualifications will also be considered on an individual basis, and

will be invited for an interview to determine suitability.

Career Options and Progression Opportunities

Industrial Engineering intends to build bridges between industry and business processes to facilitate improvements in performance, production and customer satisfaction. Industrial engineers can optimise complex processes, systems and organisations, and possess sound technical engineering knowledge. Simultaneously, they are knowledgeable in business development, operations management and project management practices. This produces highly performant graduates who thrive in industry careers. They are also able to focus on the development of project and human resource management skills. They can fill a wide variety of roles in production, manufacturing, design, logistics, testing, quality and systems development. Industrial Engineering graduates work in production and manufacturing as planning, engineers, process engineers, sales engineers, managers. They also work in quality control, cost and risk control, data analysis, optimisation, and production management as improvement specialists or quality officers. They may find work in research, design and development. (**What ISEs Do, Institute of Industrial and Systems Engineers, 2019**) Industrial Engineering has been found to attract high numbers of female graduates and is among the most diverse disciplines in engineering. This will allow B&FC to expand its action towards facilitating routes for women in STEM.

Industrial engineers are required to have a broad understanding of a range of engineering and associated management subject disciplines which are constantly updated when working in the industry. This course of study allows for the development of increased capacity of the individual, not just to incorporate immediate understanding but also to establish a comprehensive development framework to their skill set to continually develop their career progression within the industry and contribute towards innovation and development. (**IISE Overview of the Profession, Institute of Industrial and Systems Engineers, 2019**) The advantage of this approach to engineering is that it empowers students to build an adaptable knowledge base that can enable them to be proactive problem-solvers across industries and manufacturing industry giants, in transport, civil, aerospace sectors as well as high-tech companies and start-ups and smaller-scale, local enterprises, whether in the field or manufacturing or support services. Industrial engineering enables graduates to compete for a very wide range of jobs, including government positions and key roles within businesses. The development and evolution of information systems, productivity, sustainability and optimisation are among the topics industrial engineers consider on a daily basis in their work.

With an Industrial Engineering qualification, graduates may work across all sectors in process optimisation, planning, development, research, and across practically all industry fields, from healthcare and retail to energy production and manufacturing, and even banking and politics. You will be able to work as process engineer, quality control specialist, project manager, safety engineer and many others. Work will also be found in inspection services, health and safety and numerous other fields. Industrial engineers work very well in teams with all other engineering professionals and are great additions to innovative tech companies and start-ups.

Upon graduation, you may expect a reasonable starting salary depending on companies. Your salary will go up as you gather varied experience and engage in professional development and lifelong learning. Certifications in project management, lean, and lean six sigma, along with international experience, provide good opportunities to rise up in qualifications and salary. Mid-career many industrial engineers go into managerial positions that require a mix of business, management and engineering knowledge and skills. This makes them very adaptable to corporate international settings. Some consider MBA or EMBA qualifications at this point. Successful students may also wish to continue their studies by undertaking a relevant postgraduate degree at another university institution in MSc Operations Management or similar qualification, leading to even greater career opportunities. A number of industrial engineers are also entrepreneurs and business owners. A few engage in start-up ventures or work as consultants. At senior level, you may expect higher salaries in the usual engineering range

depending on knowledge, skills, experience and the company.

Programme Aims

- To train professional industrial engineers who have the skills, knowledge and confidence to apply proven principles, methods and techniques and solve engineering problems.
- To train professional industrial engineers who, individually or in a team, are able to find innovative, optimal solutions and adapt them to a range of business, manufacturing and industry problems.
- To explore new developments in the field of industrial engineering to enable students to become proficient in their knowledge and skills.
- To acquire knowledge, analyse and evaluate new developments in the industrial sector as they emerge and to apply these appropriately to industrial engineering.
- To provide students with the opportunity to gain transferable knowledge and skills and enable them to flexibly adapt to a wide variety of engineering environments and multidisciplinary teams.
- To enable students to engage fully into design, research, development, and evaluation of lean engineering systems and processes.
- To produce professional, adaptable and flexible engineers who have the capacity to work to a high standard within a range of sectors, producing sustainable outcomes for the success of the industry and their profession, taking responsibility for lifelong learning and professional development
- To provide students with the opportunity to gain a critical and informed awareness of contemporary issues, legislation, problems and opportunities afforded by a focus upon engineering in recognition of the impact of the demands of industry
- To provide academic, technical and personal development through a variety of learning experiences, in particular, the development of communication skills and capability of critical analysis, problem solving, the presentation and justification of rational argument and alternative courses of action
- To facilitate the opportunity to pursue the level of study which will enable students to critically review, consolidate and extend a systematic and coherent body of knowledge, by utilising specialized industrial engineering skills, methods and techniques.
- To enable students to critically evaluate concepts and evidence from a range of sources; transfer and apply diagnostic and creative skills and exercise significant judgement in a range of situations, accepting accountability for determining and achieving personal and/or group outcomes.

Programme Learning Outcomes

Level 6

Upon successful completion of this level, students will be able to:

1. Work in teams, managing tasks and resources to meet changing technical and managerial needs which support continuous quality improvement.
2. Use interpersonal skills to communicate technical and non-technical information to a variety of audiences.

3. Apply ethical principles to sustainable professional practices in an engineering context which recognise obligations to society, the profession and the environment.
4. Critically evaluate the social, environmental, ethical, economic and commercial considerations that affect companies, businesses and the industry when applying industrial engineering decisions and solutions.
5. Critically analyse and evaluate complex engineering systems, processes and their interdependencies through the application of systems thinking with an awareness of the wider engineering context.
6. Interrogate efficiency, productivity, operational and managerial problems using a sound evidence base to contribute to improved effectiveness of products, systems and services supporting sustainability and optimisation.
7. Use general IT facilities and information retrieval skills to develop planning and teamwork which support lifelong learning and continuing professional development.
8. Use various software tools for the specific purposes of industrial engineering with an awareness of the need for flexibility and continuous adaptability to new developments in this domain.
9. Use and apply quantitative science and engineering tools to the analysis of industrial engineering problems.
10. Use and apply national and international industrial engineering and business standards and methods with an awareness of the need to engage in continuous improvement of methodologies to maximally optimise processes.
11. Apply knowledge and skills to the wider multidisciplinary engineering context and its underlying principles as well as to the wider business context.
12. Critically analyse and evaluate complex engineering systems and their interdependencies through the application of systems thinking via analysis of the wider engineering context.
13. Critically apply lean systems and processes to extend technological capability and manufacturing capacities. Use lessons learned from this application to develop and expand knowledge bases and find new lean applications, techniques and processes.
14. Independently plan, manage and execute a technically and theoretically informed extended enquiry, which analyses engineering problems, proposes engineering solutions, broadly deepens knowledge and skills base and critically evaluates outcomes.
15. Provide solutions to identified engineering problems in order to formulate optimal, innovative, efficient and sustainable designs, products and services.
16. Design, develop and implement procedures and plans to undertake industrial engineering tasks; identify problems and develop solutions through critical evaluation and bearing in mind lean processes and systems.
17. Problem solve, communicate and work collaboratively with others and independently to develop innovative ideas and new ways of thinking to support the development of business practices and knowledge.

Programme Structure

Module	Level	Credits	%	Category	Description	Length/Word Count	Grading Method
Stage 1							
B4SCENG-IE: Introduction to Academic Study (Mandatory)	4	20	60%	Coursework: Other	Written piece and reflection - MUST PASS	2000	Letter Grade
			40%	Practical: Other	Case study, analysis, interpretation (1500 words) and poster presentation (15 minutes) - MUST PASS	15	Letter Grade
ENG402: Engineering Science (Mandatory)	4	20	50%	Coursework: Report	n/a - MUST PASS	2000	Letter Grade
			50%	Coursework: Report	n/a - MUST PASS	2000	Letter Grade
ENG403: Managing a Professional Engineering Project (Mandatory)	4	20	100%	Coursework: Report	n/a - MUST PASS	3500	Letter Grade
			-	Practical: Presentation	n/a	15	Pass/Fail
ENG404: Engineering Mathematics (Mandatory)	4	20	60%	Coursework: Assignment	n/a - MUST PASS	1200	Percentage Grade
			40%	Written Exam: Formal Written Examination	n/a - MUST PASS	120	Percentage Grade
ENG405: Computer Aided Design (Mandatory)	4	20	100%	Coursework: Portfolio / e-Portfolio	n/a - MUST PASS	4000	Letter Grade
ENG406: Engineering Design (Mandatory)	4	20	80%	Coursework: Report	Written design specification and report - MUST PASS	3000	Letter Grade
			20%	Practical: Presentation	n/a - MUST PASS	15-20	Letter Grade
Stage 2							
ENG501: Further Engineering Mathematics (Mandatory)	5	20	50%	Coursework: Other	Applied Mathematical Study - MUST PASS	1600	Percentage Grade
			50%	Written Exam: Formal Written Examination	n/a - MUST PASS	120	Percentage Grade
ENG502: Professional Engineering Management (Mandatory)	5	20	100%	Coursework: Portfolio / e-Portfolio	n/a - MUST PASS	4000	Letter Grade
ENG503: Research Project (Mandatory)	5	20	100%	Coursework: Report	n/a - MUST PASS	3000	Letter Grade
			-	Practical: Presentation	n/a - MUST PASS	20	Pass/Fail

ENG531: Lean Manufacturing (Mandatory)	5	20	60%	Coursework: Project	This project will be formulated as a practical, theoretical or analytical work on lean methods and tools to be used in a real scenario or applied to a case study. - MUST PASS	2500	Letter Grade
			40%	Written Exam: Formal Written Examination	This is an open-book exam which will contain a mix of multiple-choice questions and free written answers sections. - MUST PASS	120	Percentage Grade
ENG532: Industrial Systems (Mandatory)	5	20	60%	Coursework: Report	Report - MUST PASS	2500	Letter Grade
			40%	Practical: Other	Case study collaborative analytical workshop - MUST PASS	1500	Letter Grade
ENG533: Quality Management Systems (Mandatory)	5	20	70%	Coursework: Report	Report on a quality management case study to cover all topics covered in the lectures. - MUST PASS	2500	Letter Grade
			30%	Written Exam: Formal Written Examination	n/a	120	Percentage Grade
Stage 3							
ENG601: Dissertation (Mandatory)	6	40	5%	Coursework: Other	Proposal - MUST PASS	1500	Letter Grade
			80%	Coursework: Dissertation	n/a - MUST PASS	10000	Letter Grade
			15%	Practical: Presentation	n/a - MUST PASS	20	Letter Grade
ENG602: Professional Engineer (Mandatory)	6	20	50%	Coursework: Case Study	Written case study analysis - MUST PASS	2000	Letter Grade
			50%	Coursework: Other	Reflective Log and Presentation - MUST PASS	2000	Letter Grade
ENG603: Control and Simulation (Mandatory)	6	20	40%	Coursework: Report	Technical / Laboratory Reports - MUST PASS	1600	Letter Grade
			60%	Written Exam: Formal Written Examination	n/a - MUST PASS	120	Percentage Grade

ENG631: Manufacturing Systems Engineering (Mandatory)	6	20	40%	Coursework: Project	Personal written technical report, incorporating a reflective account, literature research and theoretical applications in practice. - MUST PASS	1500	Letter Grade
			60%	Practical: Practical Skills Assessment	Manufacturing simulation project with Digital Components and/or another manufacturing simulation software of your choice. - MUST PASS	2500	Letter Grade
ENG632: Operations and Plant Management (Mandatory)	6	20	70%	Coursework: Report	n/a - MUST PASS	2500	Letter Grade
			30%	Written Exam: Formal Written Examination	n/a	120	Percentage Grade

Study Workload

This degree is equivalent to 360 credits and the award you will obtain is a Lancaster University Bachelor of Engineering with Honours.

This programme requires commitment to attend lectures and workshops at Bispham Campus in line with your study timetable. It is a requirement of the programme that you also undertake appropriate independent study and further reading and assessment.

The programme is offered on a full time basis which will typically require attendance on campus for two full days per week over three years.

A part time pathway can be followed from level 5 onwards, which would typically require attendance on campus one full (long) day per week over 3 years.

As well as attendance to lectures, you are expected to undertake sufficient self-directed study. For each hour of class contact, you can typically expect to undertake an additional 2-3 hours of work, however this is dependent upon individual progress.

Programme Delivery: Learning and Teaching

The programme will be delivered using a range of methods, which may include formal lectures, tutor-led group discussions, debates, presentations, technical workshops, computer laboratory activities, group/ pair work, group/ pair and individual research and seminars. Your tutors will engage you with guest lecturers where relevant, with video material and practical exercises. Modules are designed to integrate practical and theoretical applications. Software and laboratory equipment will be regularly introduced by tutors and applied at relevant points within your studies.

When appropriate, field trips to businesses, manufacturing facilities and other industry-specific locations will enable you to see the daily work of industrial engineers and to think of new ways to adapt your industrial engineering knowledge and skills to a variety of sectors. You will have the opportunity to work with case studies and practical tasks. Engaging with companies, the business world and the industry is vital for industrial engineers and that is why you will usually work on real-life examples of the challenges industrial engineers face in their workplace.

You will significantly benefit from relatively small class sizes and a warm and friendly learning environment which encourages effective group interaction. Tutors are available and supportive which will enhance your learning experience. You will have access to outstanding specialist facilities and equipment including our Advanced Technology Centre abounding with industry-standard equipment and software relevant to your future engineering career.

Programme Delivery: Assessment

Various modes of assessment will be used in different modules to ensure all aspects of learning are assessed and that you are competent in different forms of demonstrating your knowledge. These will range from real case studies, practical tasks, live presentations and briefing sessions, written assessments in the form of lab and project reports, computer aided design projects and written examinations. Assessments are varied to enable you to practice for realistic scenarios in the workplace. You will be supported in the preparation for assessments via readily available tutorial sessions and tutor feedback. Assessment briefs will be provided to you for each assessment with a clear outline of what is expected, including marking schemes.

Programme Delivery: Work Based and Placement Learning

The programme has been designed to carefully align with industrial need.

You are strongly encouraged to gain work experience, via summer internships, short courses in industry, and industrial visits. Although work placement is not an integral part of the programme, we regularly invite guest speakers, employers and previous students at relevant points throughout your studies to integrate the academic and work based experience.

You will also have the opportunity to volunteer for engineering events and competitions which will involve hands-on, experiential learning tasks based on industry practice.

Case studies of workplaces and employment will be embedded within specific modules and will feature throughout the programme, as will the development of aligning attitudes and behaviours expected of a professional engineer.

The following strands have been identified for the programme:

Collaborative teamwork and leadership skills: Academic and Digital Literacy and Managing a Professional Engineering Project are the two modules that will require you to build solid teamwork and leadership skills. Collaborative projects and assignments will help you enhance and practice this skill set. You will use these skills throughout your studies and across all other modules.

Communication, information and digital literacies: Computer Aided Design, as well as project and academic literacy work will enhance your communication skills at all levels. Along with the Academic and Digital Literacy module. You will pay attention to how you gather and analyse data, what information is relevant and how to use it and present it effectively and professionally.

Personal and intellectual autonomy: Throughout all modules at this level, you will have to learn to become increasingly independent and self-reliant while continuing to participate in group and teamwork. Engineering Mathematics and Engineering Design specifically require a considerable amount of individual work. It is imperative that you gain autonomy at this stage so as to be able to cope with work on Level 5.

Ethical, social and professional understanding: With the module Professional Engineering Management as well as with the specialty modules such as Industrial Systems, Quality Systems Management and Lean Manufacturing you will gain a considerable amount of professional skill and understanding and will begin to apply mechanical engineering principles to various engineering problems. These will include issues that may have ethical, social, community impacts and you will need to consider these in your work.

Global citizenship: the modules at Level 5 all consider issues of global importance and the examples that you will cover in specialist modules will usually related to issues such as sustainability, innovation, finding suitable solutions to problems arising from an increasingly global society.

Enterprise and entrepreneurial awareness and capabilities: Professional Engineering Management and Research Project are modules that will greatly expand your entrepreneurial awareness and options in this field. Backed up by the specialist modules at this level, you will get insights into the various options individual or team enterprises have and how you can innovate and create.

Research, scholarship and enquiry skills: You will be applying all other skills and attributes acquired at Level 3 and 4 to the Dissertation module which will build your research, scholarship and enquiry skills to produce an original piece of research on a topic of interest to your field. You will also use them in the module Professional Engineer and across all specialist modules at this level.

A commitment to lifelong learning and career development: At this stage you will already be familiar with the many options Mechanical Engineering presents and you will be expected to have an awareness of the professional development path you would like to pursue. Your tutors will help you with advice. Of particular importance are the modules Control and Simulation, Structural and Dynamic Analysis and Thermodynamic Systems, which will allow you to expand your professional skills and knowledge and will help you pick a direction for lifelong learning and development.

There is a strong emphasis on employability and enhancement of graduate skills in all years of the BEng programmes. From Level 4 study onwards, personal development plans (PDP's) will be driven through a tutorial system and will focus on identifying the skills and attributes of graduate engineers as employees, with the formulation and setting of action plans to achieve

them. Teaching, learning and assessment methods allow development of key transferable skills such as problem solving, ethics and globalization through communication and digital literacy. The production of assessment work in varied formats such as engineering reports, essays, oral presentations and discussions will contextualize the communication and cognitive requirements of modern employable engineers.

Professional accreditation will be a key strategic addition to this developing programme, providing potential employees with a developmental route to professional recognition and chartered status. The expectation is that all students will register and become at least a student member of the IMechE or IET (or similar appropriate Professional Institution) during the programme. A viable approach to good practice in preparation for professional recognition is for students to record their experience, preferably via the Professional Engineering Institution's (PEI's) online recording mechanisms. Students will be encouraged to begin to apply for Incorporated Engineer (IEng) status upon completion of the programme and commencing their career as engineers. Students professional recognition will aid their career potential and provide further and wider learning opportunities. EnginE engagement has shown local potential for engaging with employers, particularly regarding improvement specialists with a BEng (Hons) qualification.

Study Costs: Equipment Requirements

Refer to our [tuition fees guide](#).

You will need your own scientific calculator; we recommend the Casio FFX-91ES (costs start from around £15).

Books, Journals and electronic resources can be accessed via the College Learning Resources facility.

Study Costs: Additional Costs

Other Costs

There may be additional costs to consider such as optional educational visits and photocopying/printing. It is highly recommended (but not mandated) that at the start of your programme, you apply for student membership through a professional organisation such as IMechE or IET. Some organisations provide discounted student membership whilst for others there is no charge.

IMechE - Affiliate Member: No charge for an apprentice or studying engineering at college or an undergraduate student studying a STEM degree.

IET - Students and apprentices (one year) £20.00. Students and apprentices (for duration of course, up to five years) £50.00

Cost Benefits

As a student on our programmes you are entitled to discounted (and some free) edition software for educational use. Offers vary from year to year but: Microsoft Student packages, Computer Aided Design and Computation Fluid Dynamics Software are examples of this. Tutors will advise of opportunities available when you start the programme.

Related Courses

Related course within this discipline:

BEng Aerospace

BEng Mechanical

BEng Mechatronics

BEng Electrical/Electronic