



# Programme Specification

## ENG-MT-2017: Engineering (Mechatronics Engineering)

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

Programme Status: Approved | Version: 2

## Introduction

This programme specification provides a summary of the main features of the Engineering (Mechatronics 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

<b>Programme Code</b>	ENG-MT-2017
<b>Programme Title</b>	Engineering (Mechatronics Engineering)
<b>Teaching Institution</b>	Blackpool and The Fylde College
<b>Professional, Statutory and Regulatory Body (PSRB) Accreditation</b>	None
<b>UCAS Code</b>	
<b>Language of Study</b>	English
<b>Version</b>	2
<b>Approval Status</b>	Approved
<b>Approval Date</b>	30 August 2018
<b>JACS Code</b>	
<b>Programme Leader</b>	Margarita Georgieva

## Programme Awards

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

## Programme Overview

Mechatronics encompasses the study of mechanical, electrical / electronic and control engineering and originates from the need to deal with ever more complex technological systems. It is a multidisciplinary field, which means that it incorporates knowledge from several engineering fields into one. Mechatronics engineers develop a synergistic approach to the various fields they work in to produce optimized, reliable and economical systems or products. Many work in robotics and in innovative high-tech companies.

Through consultation with local employers, we have developed a highly industry-relevant programme in Mechatronics that delivers the knowledge, experience and general transferable skills required for employment in this broad and exciting field that produces the technological innovations of the future. Our BEng (Hons) Mechatronics Engineering programme will provide you with core principles of engineering and specialist Mechatronics knowledge. You will have the opportunity to customise your course to follow a Mechatronics pathway, after you have sampled core engineering subjects.

The course consists of core common modules at Level 4 and then develops with more subject specialisms at Levels 5 and 6. Opportunities to explore software and practical subject areas such as computer aided design, microprocessors and controls & simulation are embedded within the modules to enable a blend of practical and theoretical experiences to enhance employability.

A current shortage of skilled Mechatronics engineers means there are excellent career opportunities for talented engineering graduates as design, production and project engineers within a variety of sectors. 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 for entry post 2017 (or 120 points pre-2017 UCAS system) (excluding functional skills) from one of the following:
  - 2 GCE A2 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 direct entry onto Level 5 of the programme are:

- HNC or HND with an overall merit grade in: Mechanical, General or Aeronautical Engineering or an appropriate Engineering discipline.

### At either entry level:

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 to an interview to determine suitability.

## Career Options and Progression Opportunities

Mechatronics has a very wide range of application and graduates are able to work in automation, robotics, manufacturing, automotive and many others. Computer-aided design (CAD) is particularly valuable for mechatronics engineers, along with advanced IT skills and a good knowledge of mechanics and electrical/electronic principles. With such a profile, you will find work in fields such as biomedical (designing and producing artificial limbs or medical imaging systems), transportation and innovative vehicles development, packaging, industrial goods manufacture, consumer products manufacture.

You can expect numerous opportunities internationally and an upper-range starting salary. Depending on your professional development and if you engage in lifelong learning, your senior level salary may go as high as £70,000. You may also decide to go into further study, Master and research qualifications, which might orient you towards work for international development and research facilities and laboratories. You can expect to work in an office or a laboratory and you might be taking frequent trips to manufacturing locations. Jobs in Mechatronics are very diverse and overall dynamic and interesting with a strong potential to develop the innovative technologies of the future. This will also require of you to become attentive to issues of sustainability, ecology, health and safety, and the broader problems and needs of your community.

## Programme Aims

- To train professional mechatronics engineers who synergistically apply mathematics, mechanical, electrical and electronics as well as computer engineering and scientific principles and knowledge with confidence in solution to engineering problems.
- To train mechatronics engineers with a broad range of skills and in-depth knowledge of connected disciplines, such as electrical and electronic and mechanical engineering, and an understanding of how they come together in various fields.
- To explore new developments in the field of mechatronics research and advanced technologies, manufacturing, embedded systems to enable students to become proficient engineers with a robust foundation.
- To acquire knowledge, analyse and evaluate new developments in mechatronics and related engineering fields as they emerge and to apply these appropriately in creative, innovative solutions to problems.
- To provide transferable knowledge and skills to enable graduates to engage fully in design, research, development, testing and deployment of mechatronics systems across all spheres of life and enhance lives and technological performance of communities and human-made systems.
- To produce adaptable professional engineers who have the capacity to work at a high standard within a wide range of sectors.
- To educate a network of mechatronics engineers in sustainability, ecological awareness, health and safety and who take responsibility for lifelong learning, as well as the success and growth of their profession and community.
- 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, especially as regards ethical considerations in device development, robotics, AI and other future advances in engineering.
- 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 specialised skills across an area of study.
- To enable students to critically evaluate concepts and evidence from a range of sources, to transfer and apply diagnostic and creative skills and exercise significant judgement in a range of situations, accepting responsibility and 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 analyse and evaluate complex systems and their interdependencies through the application of systems thinking and the integration of approaches from multiple engineering disciplines

5. Independently plan, manage and execute a technically and theoretically informed project, which spans all engineering disciplines and analyses engineering problems across mechanical, electronic, electrical, computer, systems and industrial engineering, and proposes engineering solutions that broadly deepen knowledge and skills base
6. Utilise a multidisciplinary approach to engineering through adaptations of essential facts, concepts, theories and fundamentals, supported by a sound scientific and mathematical foundation
7. 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 scientific knowledge
8. Use advanced software and hardware to collaboratively or independently plan, design, and develop products
9. Utilise mechatronics technical expertise, knowledge and skills in a wider multidisciplinary engineering context to advance industry and technology fields by identifying relationships between engineering fields and mechatronic engineering
10. Engineer creatively and innovatively emerging technologies to enhance and develop quantitative science and its applications
11. Design, implement or create embedded, multifunction solutions that incorporate safe, sustainable and durable materials, and that operate to the advantage and benefit of users
12. Apply knowledge and methods from a range of engineering disciplines to solve problems, effectuate repairs, or build new technologies
13. Evaluate impacts of mechatronics on the environment, the social and economic landscape of communities and regions, as well as the ethical concerns that might arise from engineering solutions
14. Analyse the need for new applications and techniques from a multifaceted perspective so as to produce highly competitive, innovative, integrated and advanced technologies
15. Critically integrate of methods, processes and techniques across engineering fields
16. Critically evaluate industry standards by seeking further integration of systems, principles, methods and tools

## Programme Structure

Pathway	Module	Level	Credits	Coursework	Practical	Written Exam
<b>Stage 1</b>						
All	B4SCENG-MT: Introduction to Academic Study (Mandatory)	4	20	60%	40%	
	ENG402: Engineering Science (Mandatory)	4	20	100%		
	ENG403: Managing a Professional Engineering Project (Mandatory)	4	20	100%		
	ENG404: Engineering Mathematics (Mandatory)	4	20	60%		40%
	ENG405: Computer Aided Design (Mandatory)	4	20	100%		
	ENG406: Engineering Design (Mandatory)	4	20	80%	20%	
<b>Stage 2</b>						
<b>Stage exit award: LU Diploma of Higher Education (Awarded by Lancaster University)</b>						
All	ENG501: Further Engineering Mathematics (Mandatory)	5	20	50%		50%
	ENG502: Professional Engineering Management (Mandatory)	5	20	100%		
	ENG503: Research Project (Mandatory)	5	20	100%		
	ENG504: Engineering Dynamics (Mandatory)	5	20	50%		50%
	ENG521: Mechatronic Systems (Mandatory)	5	20	30%	70%	
	ENG522: Electrical and Electronic Systems (Mandatory)	5	20	50%		50%
<b>Stage 3</b>						
<b>Stage award: LU Bachelor of Engineering with Honours (Awarded by Lancaster University)</b>						
All	ENG601: Dissertation (Mandatory)	6	40	85%	15%	
	ENG602: Professional Engineer (Mandatory)	6	20	100%		
	ENG603: Control and Simulation (Mandatory)	6	20	40%		60%
	ENG621: Microprocessors and Microcontrollers (Mandatory)	6	20	50%		50%
	ENG622: Electrical Power (Mandatory)	6	20	40%		60%

## Course Options

The programme is offered on a full-time basis, however there is also opportunity for employees to enter the programme at level 5 with a suitable entry qualification and study on a part time basis to align with employment needs:

- Full time - typically 2-3 days per week over 3 years
- Part time - typically 1 day per week over 3 years (with direct entry to Level 5 via a suitable HNC/D).

Please note: Level 4 is delivered on a full-time basis only. We offer an alternative part-time HNC route onto the degree programme also if required.

Our BEng programme starts with a range of common core modules at Level 4. You will then continue onto specialist modules at Levels 5 and 6.

## Study Workload

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. Each student needs a different amount of independent study, which will depend on the individual profile and needs. Our tutors can help you with advice and support.

## Programme Delivery: Learning and Teaching

The course will be delivered using a range of methods, which may include informal lectures, tutor-led whole group discussions, student presentations, technical workshops, computer laboratory activities, group work, group and individual research and seminars. Modules are designed to integrate practical and theoretical application, so software and laboratory equipment will be regularly introduced by tutors and applied at relevant points within your studies.

You will significantly benefit from relatively small class sizes and a warm and friendly learning environment which encourages effective group interaction. Tutors are very accessible and supportive which will enhance your learning experience.

You will have access to outstanding specialist facilities and equipment including our Advanced Technology Centre (new in 2015) 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 world case studies, live presentations and briefing sessions, written assessments, computer aided design projects and written examinations. You will be supported in the preparation for assessments via readily available tutorial sessions and tutor support.

## 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.

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.

## Programme Delivery: Graduate Skill Development

The BEng Mechatronics programme offers you the opportunity to experience and develop a range of skills related to the discipline. These include accessing and evaluating information from a range of technical sources and communicating findings in a range of ways suitable to engineering.

Modules are designed to develop your existing skills to enable you to become independent engineers and will provide the basis for a successful career in engineering, developed through industry and academic research and enquiry. Further skills in technical information analysis and application will be developed during the delivery of the programme content through lectures, guest speakers and research into engineering systems, sub-systems and approaches.

### Level 4

- **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 analyze 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.

During Level 4 study, you will experience a wide-range of the general engineering curriculum across 6 core modules: including mechanical engineering, electrical and electronic engineering, applied mathematics, engineering design and computer aided engineering. These modules are supported by project and laboratory work and also educational study skills. This broader approach, allows you to sample engineering disciplines so you can switch to an alternative



engineering discipline if you choose to do so at the end of this stage. It also ensures that you have a solid grounding in digital literacy, ethical considerations and develop an appetite for lifelong learning which you will carry through into subsequent years and hopefully further study.

## Level 5

- **Ethical, social and professional understanding:** With the module Professional Engineering Management as well as with the specialty modules Mechatronic Systems, Electrical and Electronic Systems, and Engineering Dynamics, 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, Research Project, and Computer-Aided Design along with the other professional modules will expand your entrepreneurial awareness and options in this field. Your Level 4 knowledge and skills will be backed up by specialist modules at this level. You will gain insight into the various options that individual or team enterprises have and how you can innovate and create.

At Level 5, there are four core modules and two subject specialist modules. Group and team working will be an inherent part of the programme within your engineering project, allowing peer and self-assessment approaches to be introduced, developing essential communication, ethical awareness and management characteristics. You will continue to apply the principles studied at Level 4 and develop your knowledge and skills in more specialized areas such as engineering dynamics, computer aided design and electrical & electronic systems.

## Level 6

**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, Electrical Power, and Microprocessors and Microcontrollers, which will allow you to expand your professional skills and knowledge and will help you pick a direction for lifelong learning and development. It is also important to remain aware of other topics within the field that you will be able to explore when you graduate.

During Level 6 of the programme, you will experience 5 modules in highly focused areas such as: electrical power, microprocessors & controllers, controls & simulation. You will explore and critically analyse the engineering environment within the 'Professional Engineer' module. You will also undertake a dissertation project based on a significant specific engineering project aligned to your interests that will shape and further define your specialized route into your chosen career.

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.

## Study Costs: Equipment Requirements

### Equipment Needs:

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.

### 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.

## Study Costs: Additional Costs

Read our [tuition fees guide](#).

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

\* Correct and 2016

## Related Courses

Related course within this discipline:

BEng Aerospace  
BEng Mechanical