

## ***BEng (Hons) Mechatronics and Computer Systems Engineering***

Course Aim and Title	BEng (Hons) Mechatronics and Computer Systems Engineering
Intermediate Awards Available	BEng Mechatronics and Computer Systems Engineering * Dip HE Mechatronics and Computer Systems Engineering * Cert HE Mechatronics and Computer Systems Engineering * BEng, Dip HE, Cert HE  * See Course Specific Regulations
Teaching Institution(s)	UEL
Alternative Teaching Institutions (for local arrangements see final section of this specification)	N/A
UEL Academic School	Architecture, Computing and Engineering
UCAS Code	
Professional Body Accreditation	N/A
Relevant QAA Benchmark Statements	Engineering (October 2019)
Additional Versions of this Course	N/A
Date Specification Last Updated	October 2019

### **Course Aims and Learning Outcomes**

The mechatronics & Computer Systems Engineering course combines principles from mechanics, electronics, control, computing, automation and robotics to design, manufacture and test smart and cognitive systems and devices, which utilise a combination of these disciplines. Students on this key undergraduate course will gain this knowledge of engineering processes and systems, product design, AI, machine learning, digital electronics and integration of these technologies. This will also enable them to create their own mechatronic systems that are smart and cognitive, developing them from imagination through to reality.

The general aim of this course is to transform learners into mechatronics engineers of sufficient knowledge of both computer and mechatronic systems to meet the demands of their profession and to enable them to progress to the status of Chartered Engineer. The specific aim of the course is to encourage students to respond to changes and developments within automation, mechanical systems, robotics and related wider engineering sector; and also to

1. Enable learners to gain extensive knowledge and understanding of the most recent theories, technologies and hands-on works in mechatronics and computer system engineering.
2. Enable learners to analyze and solve real-world problems through *learning by doing* and within the context of real-world problems.

3. Provide learners a stimulating learning environment for understanding the role of the engineer as an important profession in the automation, robotics and mechanical systems sector.
4. Improve learners' skillset to make sound judgements, and to communicate clearly to specialist and non-specialist audiences in the automation, robotics and mechanical systems sector.
5. Provide learners a platform to demonstrate self-direction and originality in solving problems, and to act autonomously in planning and implementing tasks at a professional level with clear understanding of health and safety, ethics, sustainability and legal dimensions.
6. Embed industry readiness in learners through engagement with industry experts and *real work experience*\*, within the core elements of learning and assessment.
7. Prepare learners for progression in career and educational development to pursue postgraduate studies.

\* *for optional placement programme only.*

You (students) will learn:

#### Knowledge

- An understanding of the practical procedures and techniques that will then allow the rapid acquisition of more specialist skills.
- The principles of mechatronics engineering and computer systems; application of appropriate mathematical, physics, computational techniques and methods to model and analyse real-world engineering problems.
- Design process, design methodologies, manufacturing and operational practice.
- Management and business practices and engineers' roles in society.

#### Thinking skills

- The ability to comprehend, analyse and criticise mechatronics engineering and computer systems principles.
- Management and business practices and engineers' roles in society.
- Evaluate commercial risks and technical risks in unfamiliar circumstances.
- Interpret and analyse results, data and other information to present them in suitable forms.

#### Subject-Based Practical skills

- The knowledge and skills to function effectively in industry to be able to progress in career and educational development.

#### Skills for life and work (general skills)

- Personal development techniques and confidence in your abilities to enable you to become a valued professional in the shaping of the community and society.

## Learning and Teaching

Knowledge is developed through

- lectures/guest presentations
- practical sessions
- engaging with formative tutorial work
- actively participating in design and project work
- guided reading
- knowledge-based activities with feedback
- online discussions and activities
- attending evening lectures/seminars hosted by the professional institutions

Thinking skills are developed through

- analytical assessment of data
- solving tutorial problems
- critical assessment of information
- problem-solving practical applications
- design and research projects
- reflective activities with feedback
- tutorial activities & discussions
- online discussions and activities

Practical skills are developed through

- laboratory and experimental work
- drawing and design
- application to real life and simulated case studies
- IT activities with feedback
- research skills-based activities with feedback
- seminar preparation and presentations

Skills for life and work (general skills) are developed through

- interactive communication exercises
- individual and group working sessions
- planning activities with feedback
- project and team work
- using of specialist software

## Assessment

Knowledge is assessed by

- time constrained examinations
- laboratory and practical exercises
- assignments, design and project work

Thinking skills are assessed by

- approach to solving problems
- analysis of alternative solutions
- practical solutions to complex tasks

Practical skills are assessed by

- laboratory reports and experimental assessment
- group survey work
- application to practical problem-solving

Skills for life and work (general skills) are assessed by

- oral presentations
- written communication exercises
- drawing, sketching and design work
- team project work
- use of specialist software

Students with disabilities and/or particular learning needs should discuss assessments with the Course Leader to ensure they are able to fully engage with all assessment within the course.

## Work or Study Placements

For our on-campus based students:

Students, who have come directly onto the BEng (Hons) course, can opt to undertake a sandwich placement between the second and third year of study. Alternatively, some arrange work experience over the summer.

The School has strong links with industry and employers often approach us when looking for placement / internship students.

Relevant personnel from CfSS will oversee the administration of the year out placements. We are fortunate in the support of our Industrial Advisory Board (IAB) partners in enabling this important optional element to happen, although this is a competitive process and a placement cannot be guaranteed.

## Course Structure

All courses are credit-rated to help you to understand the amount and level of study that is needed.

One credit is equal to 10 hours of directed study time (this includes everything you do e.g. lecture, seminar and private study).

Credits are assigned to one of 5 levels:

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|---|---|
| 3 | Equivalent in standard to GCE 'A' level and is intended to prepare students for year one of an undergraduate degree course. |
| 4 | Equivalent in standard to the first year of a full-time undergraduate degree course.  |
| 5 | Equivalent in standard to the second year of a full-time undergraduate degree course.                                       |
| 6 | Equivalent in standard to the third year of a full-time undergraduate degree course.  |
| 7 | Equivalent in standard to a Masters degree.   |

Courses are made up of modules that are each credit weighted.

The module structure of this course:

Level	Module Code	Module Title	Credit Weighting	Core/Option	Available by Distance Learning? Y/N
4	EG4019	Mental Wealth: Professional Life	20	Core	N
4	EG4014	Engineering Materials	20	Core	N
4	EG4016	Engineering Principles	20	Core	N
4	EG4011	Applied Mathematics & Computing	20	Core	N
4	EG4020	Thermofluids	20	Core	N
4	EG4015	Engineering Mechanics	20	Core	N
5	EG5010	Mental Wealth: Professional Life	20	Core	N
5	EG5024	Advanced Mathematics and Modelling	20	Core	N
5	EG5027	Dynamics and Control	20	Core	N
5	EG5033	Applied Electronics	20	Core	N
5	EG5042	Digital Communications & telecommunication Networks	20	Core	N
5	EG5041	Applied Programming	20	Core	N
<i>On-campus students who take an optional industrial sandwich placement would normally do so after completion of L5 modules. They are required to register for:</i>					
5	EG5023	Industrial Sandwich Placement	120P	Option	N
6	EG6011	Capstone project	40	Core	N

6	EG6010	Mental Wealth: Professional Life	20	Core	N
6	EG6021	Design of Mechatronics Systems	20	Core	N
6	CN6005	Artificial Intelligence	20	Core	N
6	EG6025	Systems integration	20	Core	N

*Please note: Optional modules might not run every year, the course team will decide on an annual basis which options will be running, based on student demand and academic factors, in order to create the best learning experience.)*

Additional detail about the course module structure:

Part time day release students would normally study 60 credits per academic year and follow the same structure as noted for full time study.

The optional level P placement module EG5023 is required to obtain a sandwich degree, in addition to the other requirements, but does not count towards the degree classification.

A core module for a course is a module which a student must have passed (i.e. been awarded credit) in order to achieve the relevant named award. An optional module for a course is a module selected from a range of modules available on the course.

The overall credit-rating of this course is 360 credits. If for some reason you are unable to achieve this credit you may be entitled to an intermediate award, the level of the award will depend on the amount of credit you have accumulated. You can read the University Student Policies and Regulations on the UEL website.

### Course Specific Regulations

\* It will be at discretion of the Assessment Board whether Intermediate Awards are named or unnamed.

### Typical Duration

It is possible to move from full-time to part-time study and vice-versa to accommodate any external factors such as financial constraints or domestic commitments. Many of our students make use of this flexibility and this may impact on the overall duration of their study period.

The expected duration of this course is 3 years full-time or 6 years part-time.

A student cannot normally continue study on a course after 4 years of study in full time mode unless exceptional circumstances apply, and extenuation has been granted. The limit for completion of a course in part time mode is 7 years from first enrolment.

### Further Information

More information about this course is available from:

- The UEL web site ([www.uel.ac.uk](http://www.uel.ac.uk))

- The course handbook
- Module study guides
- UEL Manual of General Regulations (available on the UEL website)
- UEL Quality Manual (available on the UEL website)
- School web pages

All UEL courses are subject to thorough course approval procedures before we allow them to commence. We also constantly monitor, review and enhance our courses by listening to student and employer views and the views of external examiners and advisors.

**Additional costs:**

While the university will provide suitable personal protective equipment (PPE) for students to work in workshops and/or laboratories where PPE is required, students have to provide their own steel-toe-capped footwear. This will be approximately £100.

**Alternative Locations of Delivery**

N/A