

## PROGRAMME SPECIFICATION

### BEng (Hons) Mechanical Engineering and Manufacturing

<b>Final award</b>	BEng(Hons)
	<i>BEng, Dip HE, Cert HE</i>
<b>Mode of delivery</b>	<i>AMC on campus</i>
<b>UCAS Code</b>	<i>H101</i>
<b>Details of professional body accreditation</b>	
<b>Relevant QAA Benchmark statements</b>	<i>Engineering</i>
<b>UEL Academic School</b>	<i>Architecture, Computing and Engineering</i>
<b>Date specification last updated</b>	May 2016

#### Alternative locations for studying this programme

<b>Location</b>	<b>Which elements?</b>	<b>Taught by UEL staff</b>	<b>Taught by local staff</b>	<b>Method of Delivery</b>
<i>AMC, Athens</i>	<i>Entire course</i>	<i>No</i>	<i>Yes</i>	<i>Full Time / Part Time</i>
<i>AMC, Thessaloniki</i>	<i>Entire course</i>	<i>No</i>	<i>Yes</i>	<i>Full Time / Part Time</i>

#### The summary - UCAS programme profile-

##### **BANNER BOX:**

Why study a mechanical engineering degree? As a mechanical engineer you will play an instrumental role in the design and manufacture of items that impact on modern living and our everyday lives. The mechanical engineer's interests encompass the design of automotive and aerospace systems, bioengineering devices, and energy-related technologies. Our mechanical engineering programme is built on a strong foundation of theory, reinforced by practical experience and innovation and offers mechanical engineering with the ability to combine it with specialisations including manufacturing technology, project management, energy technology and computer modelling.

## **ENTRY REQUIREMENTS**

The standard entry requirement for students entering level 3 will be a Greek Secondary School diploma (Apolytirion of Lykeio) with a minimum average of 10 (equivalent of 50%).

The standard entry requirement for students entering level 4 will be a Greek Secondary School diploma (Apolytirion of Lykeio) with a minimum average of 17 (equivalent of 85%).

Non-Greek nationals who have obtained this qualification through attendance in the Greek schooling system will be eligible for admission on the same basis as Greek nationals. Greek nationals who have been schooled overseas may be admitted to the programme on demonstrating that:

1. They hold a qualification recognised by UEL for admission to undergraduate programmes, as documented in the current edition of the “Blue Book”
2. They have demonstrated command of the Greek language through possession of an appropriate qualification recognised by the Greek educational authorities and a fair command of the English language at the discretion of AMC.

AMC has an organized interviewing and admissions process which it follows for every academic programme it offers. Candidates are expected to sit one or more interviews with a qualified interviewer (who is usually the Programme Leader in the student’s respective subject area of interest). Following the interview, candidates are required to fill out an application form which formalizes their request to be granted admission to their chosen programme of study. All decisions on student admission are then undertaken by a committee consisting of the Director, the Programme Leader, and selected course tutors.

At AMC we are committed to working together to build a learning community founded on equality of opportunity - a learning community which celebrates the rich diversity of our student and staff populations. Discriminatory behaviour has no place in our community and will not be tolerated.

Within a spirit of respecting difference, our equality and diversity policies promise fair treatment and equality of opportunity for all. In pursuing this aim, we want people applying for a place at AMC and partner institution UEL to feel valued and know that the process and experience will be transparent and fair and no one will be refused access on the grounds of any protected characteristic stated in the Equality Act 2010 and embedded in the Hellenic Republic Constitution (Articles 22 and 25) as well as Greek Law (N1946, N1771, N1329, PD465).

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## **ABOUT THE PROGRAMME**

### **What is Mechanical Engineering and Manufacturing?**

Mechanical engineering is perhaps the most comprehensive of the engineering disciplines. Mechanical engineers are recognised for their knowledge and skills in designing, implementing and operating devices, machines, engines, and energy systems. Mechanical engineers design and build mechanical devices that use mechanical motion. They apply the fundamentals of science and mathematics to create practical, useful solutions that the rest of us can use. It is through their skills and technical expertise that today's engineers can combine the latest advances in materials and design tools, with a fundamental understanding of engineering science, to design and manufacture goods that are more reliable. These challenges ensure there will always be rewarding and well-paid careers for qualified mechanical engineers. The diverse mechanical engineering field includes developing

products ranging from household goods, sports equipment , biomedical devices, reliable cars and transport systems, developing the machines that process materials into products and designing and building machines and systems of machines that improve operating efficiency and environmentally sustainable.

The programme feature up-to-date modules in new and emerging technologies in a wide range of mechanical engineering topics. Hence, graduates will be equipped with the necessary knowledge, skills and competences to pursue engineering managing careers, among the traditional career paths in these fields.

### **Mechanical Engineering and Manufacturing at AMC**

The Mechanical Engineering programme at AMC follows that at UEL and is a franchised programme of study. It is designed to respond to demands of workforce in mechanical engineering sectors. It intends to equip our students with relevant and up-to-date knowledge and skills for their engineering competencies and careers. Our mechanical engineering programmes is a combination of maths, science, technology

and management. Throughout your studies, you acquire not only an understanding of general engineering principles but also a range of transferable skills.

Students have a chance to broaden and deepen their knowledge in wide range of mechanical engineering subjects. This enables our students to undertake an advanced treatment of core mechanical engineering disciplines such as design analysis, dynamic systems, computational fluid dynamics, advanced materials, control systems and sustainable energy technologies. In our course you will be using simulation and modelling application software for virtual design and manufacturing and investigate real industrial problems to enhance understanding of the profession. The latter will also be linked tie in the topic of your individual project and benefit from the expertise of our active research academics.

We have developed our programmes that are current and will give you the opportunity to develop an understanding of advanced knowledge and skill set. With very good facilities for laboratory and practical work you will be able to reinforce the advanced theories and practical studies providing 'hands on' experience. Our programme offers you the opportunity to study and apply the knowledge and theories required by mechanical engineers.

### **Programme structure**

Study is based on three years of full-time (six years part-time) or four years on the extended BEng counterpart. The programme is based on core studies in the first three years of study (or four for the extended BEng) embracing mechanics, dynamics, fluids, materials and manufacturing.

### **Learning environment**

The programme benefits from access to purpose built laboratories and computer suites. Teaching is delivered through formal lectures, tutorials, and laboratory sessions. Lectures are supported by core texts and course notes and material uploaded to AMC virtual learning environment that allow you to concentrate on the lecture and to aid independent study. Group work is encouraged and is used to good effect during the second year module Group Design and Employability. In addition, a Team Project resembling an industrial work environment takes place during the third year of study.

### **Assessment**

Assessment varies from module to module and meets UEL assessment criteria. Assessment may include time constrained assessments (end of module examinations or on-line tests), coursework, individual and group project work, laboratory reports and tests of competence in theoretical and practical sessions.

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

## **Work experience/placement opportunities**

The School of Engineering and Architecture at AMC has links with industry and hosts a number of visits at which informal interviews for full and part time employment opportunities take place. An employment liaison officer can assist students in making applications for the optional sandwich year, although this is a competitive process and a placement cannot be guaranteed.

## **Project work**

Project work is an important feature of this programme. Throughout your studies you will undertake small projects as part of the module assessment. During the final year of the programme you will be required to complete independent research and study of a technical subject in the form of a dissertation. This project will be supervised by a member of the academic staff with an interest in the subject and must have an industrial dimension and will include laboratory work or the analysis of a specific engineering problem. The research project often requires students to take an idea through to a working model.

## **Added value**

The programme allows students to obtain either a good job or to gain entry to postgraduate study. The programme will also be of benefit by contributing to students' transferable skills and encouraging students to learn how to study and embark on continuous self-learning pattern. Emphasis on group/team work is integrated within the programme. Also, during the final year dissertation, students demonstrate that they can take an idea through design and development to produce a functional solution to a given problem.

The programme also benefits from the use of well-equipped modern laboratories which are used for material testing, fluid mechanics, dynamics, hydraulics, structures, CNC machining, 3D printing, rapid prototyping, electronics, electrical machines and power, control systems,. In addition, there are facilities for computer-aided design and manufacture. The engineering computer lab is equipped with around 25 PCs which are connected to the university network and allow students to perform manufacturing simulation, system modelling, design and finite element analysis.

## **IS THIS THE PROGRAMME FOR ME?**

Mechanical engineering is widely reputed to be one of the most diverse engineering disciplines and deals with the design, development, installation, operation and maintenance of anything that has moving parts.

### **If you are interested in...**

- Mechanical design
- System dynamics and control
- Heat Transfer
- CAD/CAM
- Fluid Mechanics
- Vehicle Systems
- Energy Systems

### **If you enjoy...**

- Design and making things
- Mathematics
- Engineering science
- Information Technology
- Computing
- Problem solving

### **If you want...**

A course that will combine a challenging programme of academic study with opportunities to develop the personal skills that are required to become a successful engineer. There is a strong management theme throughout this course that will prepare you for a career as a mechanical engineer. It will enable you to interact with a broad range of clients and employers from small business to large multinationals and government authorities.

### **Your future career**

Because of its wide subject area, you will find mechanical engineering opportunities in a range of sectors, including: manufacturing, aerospace, automotive, construction, marine, materials and metals, railways, sport, energy, pharmaceuticals, electrical and electronic, defence and utilities. Excellent graduates can pursue their doctorate studies for academic careers.

### **How we support you**

Personal Tutors and Programme Tutors will monitor your progress and provide assistance and advice with academic and personal problems. We are pleased for students to consult whichever tutor they are comfortable talking to. The school facilities include dedicated computer laboratories and equipment that you are free to use whenever it is not being used for a class. Each laboratory has a laboratory technician on hand to help. All formal laboratory classes are supported by academics. Key local engineering employers judge an annual showcase event to final year student projects. This is an optional opportunity for our final year students.

## **Bonus factors**

Mechanical Engineering is studied (both full time and part time) at AMC Athens and Thessaloniki Campus. Industrial links and the work of our career office maintains the currency of our programmes and thereby the employment and career paths of our graduates.

## **Programme aims and learning outcomes**

### **What is this programme designed to achieve?**

This programme is designed to give you the opportunity to:

- Be a competent engineer equipped with the current knowledge, competences and skills in the field of mechanics, dynamics, fluids, design, controls, manufacturing, materials and energy systems to be able to manage and lead towards future challenges in the new and emerging technologies in the field of mechanical engineering
- Be aware of the economic, social, environmental issues facing electrical/electronic engineers
- Understand the importance of professionalism, engineering ethics and engineering management processes
- Acquire knowledge in team/group work resembling an industrial environment
- Acquire knowledge in engineering management and leadership

### **What will you learn?**

#### **Knowledge**

- Broad and deep knowledge and understanding of mechanical and electrical engineering principles, dynamics, solid mechanics, fluids, CFD, thermodynamics, heat transfer, control systems, computing techniques, mechatronics, manufacturing processes, material, energy technologies, sustainability, all underpinned by mathematics and engineering science.
- Substantial knowledge and understanding in applied mechanics, mechanical design, CAD, finite element analysis, thermodynamics, systems modelling renewable energy and advance manufacturing systems
- Wide knowledge of analytical, mathematical, problem solving.
- Ability to design and construct a coherent testing project using established

techniques.

- Ability to contribute to team project for solving complex engineering problems

### **Thinking skills**

- Critical assessment skills
- Intellectual appreciation
- Time management
- Risk management

### **Subject-Based skills**

- Ability to use commercial computer software for modelling, analysis and design
- Ability to mathematically model real engineering situations effectively
- Ability to apply the design process to enable the selection of appropriate materials and processes
- Ability to think creatively in order to develop design and analytical solutions
- Ability to work safely within appropriate codes of practice, industry standards, and contractual and quality constraints.

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

- Communication skills
- Problem-solving skills
- Advanced analytical skills
- Management skills
- Ethics
- Health and safety

## **The programme structure**

### **Introduction**

All programmes 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:

- 3 equivalent in standard to GCE 'A' level and is intended to prepare students for year one of an undergraduate degree programme
- 4 equivalent in standard to the first year of a full-time undergraduate 5 degree programme
- 5 equivalent in standard to the second year of a full-time undergraduate degree
- 6 equivalent in standard to the third year of a full-time undergraduate degree programme

### **Credit rating**

The overall credit-rating of the BEng (Hons) Mechanical Engineering and Manufacturing programme is 360 credits and 480 credits for the extended BEng (Hons) Mechanical Engineering and Manufacturing programme.

### **Typical duration**

The expected duration of this programme is three years of full-time (six years part-time) or four years on the extended BEng (Hons) counterpart. 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.

### **How the teaching year is divided**

The teaching year begins in September and ends in June

A typical student, in full-time attendance mode of study, will register for 120 credits in an academic year. A student in a part-time mode of study may register for up to 90 credits in any academic year.

### **What you will study when**

A student registered in a full-time attendance mode will take 120 credits per year. Typically, this will be comprised of four 30 credit modules. The exact number may differ if the programme is comprised of 15, 45 or 60 credits modules. An honours degree student will complete modules totaling 120 credits at level four, modules totaling 120 credits at level five and modules totaling 120 credits at level six.

**BEng (Hons) Mechanical Engineering and Manufacturing programme structure:**

Level	UEL Module Code	Available by distance learning (Y/N)	Module Title	Credit	Status
4	EG4160	N	Mechanical and Electrical Engineering Principles	30	Core
4	EG4161	N	Engineering Materials and Manufacturing Technology	30	Core
4	EG4162	N	Engineering Mathematics and Fluid Mechanics	30	Core
4	EG4163	N	Engineering Practice and Introduction to Computer Aided Design	30	Core
5	EG5160	N	Mechanics 1 and Thermofluids	30	Core
5	EG5161	N	Dynamics and Control	30	Core
5	EG5162	N	Advanced Mathematics and Mechanics 2	30	Option
5	EG5163	N	Project and Quality Management for Mechanical Engineers	30	Option
Students who take an optional industrial sandwich placement would normally do so after completion of level 5 modules. They are required to register for:					
P	EG5100	N	Industrial Sandwich Placement	120	Option*
6	EG6160	N	Computer Modelling and Techniques	30	Core
6	EG6161	N	Thermodynamics 1 and Heat Transfer	30	Core
6	EG6162	N	CFD and Energy Technology	30	Core
6	EG6163	N	Individual Research Project	30	Core

**Extended BEng (Hons) Engineering and Manufacturing full time programme structure:**

Level	Code	Module title	Credit	Status
3	EG3101	Mathematics	45	Core
3	EG3102	Physical Science	45	Core
3	EG3103	Engineering in Society	30	Core

Level	UEL Module Code	Available by distance learning (Y/N)	Module Title	Credit	Status
4	EG4160	N	Mechanical and Electrical Engineering Principles	30	Core
4	EG4161	N	Engineering Materials and Manufacturing Technology	30	Core
4	EG4162	N	Engineering Mathematics and Fluid Mechanics	30	Core
4	EG4163	N	Engineering Practice and Introduction to Computer Aided Design	30	Core
5	EG5160	N	Mechanics 1 and Thermofluids	30	Core
5	EG5161	N	Dynamics and Control	30	Core
5	EG5162	N	Advanced Mathematics and Mechanics 2	30	Option
5	EG5163	N	Project and Quality Management for Mechanical Engineers	30	Option
Students who take an optional industrial sandwich placement would normally do so after completion of level 5 modules. They are required to register for:					
P	EG5100	N	Industrial Sandwich Placement	120	Option*
6	EG6160	N	Computer Modelling and	30	Core
6	EG6161	N	Thermodynamics 1 and Heat	30	Core
6	EG6162	N	CFD and Energy Technology	30	Core
6	EG6163	N	Individual Research Project	30	Core

\*Please Note – A core module for a programme 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 programme is a module selected from a range of modules available on the programme.

**Sandwich Degree:**

The optional level P placement module EG5100 is required to obtain a sandwich degree in addition to the other requirements but does not count towards the degree classification.

**Requirements for gaining an award**

In order to gain an Honours degree you will need to obtain 360 credits including:

- A minimum of 120 credits at level four or higher
- A minimum of 120 credits at level five or higher
- A minimum of 120 credits at level six or higher

In order to gain an Ordinary degree you will need to obtain a minimum of 300 credits including:

- A minimum of 120 credits at level four or higher
- A minimum of 120 credits at level five or higher
- A minimum of 60 credits at level six or higher

In order to gain a Diploma of Higher Education you will need to obtain at least 240 credits including a minimum of 120 credits at level four or higher and 120 credits at level five or higher

In order to gain a Certificate of Higher Education you will need to obtain 120 credits at level four or higher

**Degree Classification**

Where a student is eligible for an Honours degree by passing a valid combination of modules to comprise an award and has gained the minimum of 240 UEL credits at level 5 or level 6 on the current enrolment for the programme, including a minimum of 120 UEL credits at level 6, the award classification is determined by calculating;

The arithmetic mean of the best 90 credits at level 6	x	0.8	+	The arithmetic mean of the next best 90 credits at levels 5 and/or 6	x	0.2
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and applying the mark obtained as a percentage, with all decimal points rounded up to the nearest whole number, to the following classification

70% - 100%	First Class Honours
60% - 69%	Second Class Honours, First Division
50% - 59%	Second Class Honours, Second Division
40% - 49%	Third Class Honours
0% - 39%	Not passed

## **Teaching, learning and assessment**

### **Teaching and learning**

The key teaching and learning methods used are listed below:

Knowledge is developed through

- Lectures and tutorials
- Assignments and projects
- Use of information technology (IT) and virtual learning environment (VLE)

### **Thinking skills are developed through**

- Analytical assessment of data
- Critical assessment of information
- Problem-solving practical applications

### **Practical skills are developed through**

- Laboratories and experimental work
- Research skills-based activities with feedback
- Computer-based modelling, simulation and analysis

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

- Interactive communication exercises
- Planning activities with feedback
- Individual and group projects

### **Assessment**

The following assessment methods are used:

### **Knowledge is assessed by**

- Time constrained examinations or online tests

- Assignments and laboratory reports
- Project work which include a viva

**Thinking skills are assessed by**

- Approach to solving problems
- Analysis of alternative solutions
- Practical solutions to complex tasks

**Practical skills are assessed by**

- Practical reports and experimental assessment
- Group project
- Application to practical problem -solving

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

- Project and group work
- Oral presentations
- Written communication exercises
- Problem solving and design work

**How we assure the quality of this programme**

**Before this programme started**

**Before this programme started, the following was checked:**

- There would be enough qualified staff to teach the programme;
- Adequate resources would be in place;
- The overall aims and objectives were appropriate;
- The content of the programme met national benchmark requirements;
- The programme met any professional/statutory body requirements;
- The proposal met other internal quality criteria covering a range of issues such as

admissions policy, teaching, learning and assessment strategy and student support mechanisms.

This is done through a process of programme approval which involves consulting

academic experts including some subject specialists from other institutions.

### **How we monitor the quality of this programme**

**The quality of this programme is monitored each year through evaluating:**

- External examiner reports (considering quality and standards);
- Statistical information (considering issues such as the pass rate);
- Student feedback.

Drawing on this and other information, programme teams undertake the annual Review and Enhancement Process which is co-ordinated at School level and includes student participation. The process is monitored by the Quality and Standards Committee.

Once every six years an in-depth review of the whole field is undertaken by a panel that includes at least two external subject specialists. The panel considers documents, looks at student work, speaks to current and former students and speaks to staff before drawing its conclusions. The result is a report highlighting good practice and identifying areas where action is needed.

### **The role of the programme committee**

This programme has a programme committee comprising all relevant teaching staff, student representatives and others who make a contribution towards the effective operation of the programme (e.g. library/technician staff). The committee has responsibilities for the quality of the programme. It provides input into the operation of the Review and Enhancement Process and proposes changes to improve quality. The programme committee plays a critical role in the quality assurance procedures.

### **The role of external examiners**

The standard of this programme is monitored by at least one external examiner. External examiners have two primary responsibilities:

- To ensure the standard of the programme;
- To ensure that justice is done to individual students.

External examiners fulfil these responsibilities in a variety of ways including:

- Approving exam papers/assignments;
- Attending assessment boards;
- Reviewing samples of student work and moderating marks;
- Ensuring that regulations are followed;

- Providing feedback through an annual report that enables us to make improvements for the future.

<https://www.uel.ac.uk/Discover/External-Examiner-System>

### **Listening to the views of students**

The following methods for gaining student feedback are used on this programme:

- Module evaluations
- Feedback information analysis for programme and module evaluations
- Student representation on programme committees (meeting 2 times year)

### **Students are notified of the action taken through:**

- circulating the minutes of the programme committee
- a newsletter published three times a year
- providing details on the programme notice board and/or VLE
- Individual responses to students as required
- Review of actions of each programme committee meeting

### **Listening to the views of others**

The following methods are used for gaining the views of other interested parties:

- Annual student satisfaction questionnaire
- Feedback from external examiners
- Industrial liaison advisory board
- Information from our professional body

### **Where you can find further information**

#### **Further information about this programme is available from:**

- The UEL web site (<http://www.uel.ac.uk>)
- The programme handbook
- Module study guides
- UEL Manual of General Regulations

<https://www.uel.ac.uk/Discover/Governance/Policies-Regulations-Corporate-documents/Student-Policies>



- UEL Quality Manual <https://www.uel.ac.uk/Discover/Governance/Quality-Assurance>
- School web pages (<http://www.metropolitan.edu.gr>)