



## **Programme Specification**

Mechanical Engineering and Vehicle Technology {Foundation}

[Feb][FT][GCET][4yrs]

Version: 2020-21, v2.0, 18 Mar 2024

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## Section 1: Key Programme Details

### Part A: Programme Information

**Programme title:** Mechanical Engineering and Vehicle Technology {Foundation}  
[Feb][FT][GCET][4yrs]

**Highest award:** BEng (Hons) Mechanical Engineering and Vehicle Technology

**Interim award:** BEng Mechanical Engineering and Vehicle Technology

**Interim award:** DipHE Mechanical Engineering and Vehicle Technology

**Interim award:** CertHE Mechanical Engineering and Vehicle Technology

**Awarding institution:** UWE Bristol

**Affiliated institutions:** Global College of Engineering and Technology (GCET)

**Teaching institutions:** Global College of Engineering and Technology (GCET)

**Study abroad:** No

**Year abroad:** No

**Sandwich year:** No

**Credit recognition:** No

**School responsible for the programme:** FET Dept of Engineering Design & Mathematics, Faculty of Environment & Technology

**Professional, statutory or regulatory bodies:** Not applicable

**Modes of delivery:** Full-time

**Entry requirements:** For the current entry requirements see the UWE public website.

**For implementation from:** 01 February 2019

**Programme code:** H390-FEB-FT-GE-H390

## Section 2: Programme Overview, Aims and Learning Outcomes

### Part A: Programme Overview, Aims and Learning Outcomes

**Overview:** The aim of the Faculty's BEng (Hons) programmes is to respond to the need for effective engineering practitioners by offering programmes that are an intellectually challenging mix of taught engineering science and experiential learning. The practitioner approach is intended to produce engineers with a strong orientation towards problem solving, underpinned by theoretical knowledge.

The aim of the Mechanical Engineering and Vehicle Technology programme is to produce graduates with a broad understanding of mechanical analysis and design, combined with awareness of engineering practice, information technology, manufacturing, project management and business issues, all contextualised to the automotive engineering environment. Graduates with BEng (Hons) will be equipped to solve multi-disciplinary problems and lead future developments in industry. It is anticipated that graduates from the course will play a major role in the design, management and co-ordination of multidisciplinary projects.

The development of the award was undertaken with reference to the UK QAA Subject Benchmark in Engineering (2010) with particular reference to the learning outcomes and ethos of the BEng (Hons) degree.

#### **Features of the programme:** Design and Engineering Lab Facilities

Students can access a suite of newly purchased specialist laboratories benefiting from a recent and ongoing investment. These include Automotive Engineering, Structures, Material Science, Dynamics, Thermo-fluids, plus manufacturing workshops including CNC machines and rapid prototyping.

#### Technology Enhanced Learning

Staff members in the department are keen adopters of technology to support and enhance student learning. This includes:

Computer based e-assessment implemented in a number of modules, so that students can take regular short tests with automated computer generated feedback.

Recordings of some lectures (audio and video) which are made available after classes via the university's Virtual Learning Environment.

#### Mathematics Support

The Math Support Centre provides drop-in one-to-one tuition each day and a website that provides a portal to a variety of on-line resources in mathematics and statistics.

**Educational Aims:** To prepare students for careers in mechanical and automotive engineering and related disciplines. The content of the programme ensures that students will have the appropriate level of knowledge and understanding of mechanical engineering so that they will also be suitable for employment in the wider engineering domain and not be restricted only to the automotive environment.

To provide knowledge and understanding of scientific principles and methods necessary to underpin the students' education in engineering. To provide insight into, and practical skills in, the creation of complex engineering products, particularly in relation to automotive engineering. This involves understanding the opportunities provided by vehicle power trains, chassis configurations, various materials, aerodynamics, assembly and manufacture; all considered within the constraints imposed by the relevant regulations. In addition, issues relating to efficient and effective use of resources within the power train and the reduction of environmental impact will be explored.

To provide the students with the ability to integrate their knowledge and understanding of core subject material in order to solve a substantial range of engineering problems, including ones of a complex nature.

To prepare students for progression to study for higher degrees in appropriate engineering subjects.

To continue the development of those general study skills that will enable students to become independent, lifelong learners.

### **Programme Learning Outcomes:**

On successful completion of this programme graduates will achieve the following learning outcomes.

#### **Knowledge and Understanding**

- A1. Automotive and Mechanical Engineering principles and design
- A2. Generic engineering topics, plus additional specialist subjects relating to automotive engineering (such as vehicle dynamics, aerodynamics and power train systems)
- A3. Structures, materials and safety
- A4. Integration of mechanical and non-mechanical elements in complex engineering systems
- A5. Business issues relating to automotive engineering products and manufacture
- A6. Social, environmental, ethical, economic and commercial factors and their influence on engineering practice. The effect of legislation

#### **Intellectual Skills**

- B1. The ability to produce solutions to problems through the application of engineering knowledge and understanding
- B2. The ability to use scientific principles in the modelling and analysis of engineering systems, processes and products. The ability to select and apply appropriate mathematical methods for modelling and analysing relevant problems
- B3. The ability to use a broad spectrum of technologies/techniques and solve complex engineering problems
- B4. Adoption of a creative and innovative approach to solving problems and design and manage conflicting objectives and constraints
- B5. Comprehension of the broad picture and demonstration of a professional attitude to the responsibilities of engineering practitioners.

- B6. Critical Thinking: The ability to select and apply appropriate mathematical and computer based methods for modelling and analysing problems in fields relating to the design, manufacture and control of automotive components and systems

### **Subject/Professional Practice Skills**

- C1. Appropriate skills including safe working in experimental work in laboratories and workshops
- C2. Demonstrate practical testing of engineering ideas through laboratory work or simulation with supporting technical analysis and critical evaluation of results
- C3. Understanding and execution of the design process
- C4. Use of a range of computer software for design, analysis and control
- C5. Execution and management of multi-disciplinary projects, both individually and as a member of a group

### **Transferable Skills and other attributes**

- D1. Communication skills: to communicate orally or in writing, including, for instance, the results of technical investigations, to peers and/or to “problem owners”
- D2. Self-management skills: to plan and manage time, to meet deadlines and to work with others
- D3. IT Skills in Context (to use software in the context of problem-solving investigations, and to interpret findings)
- D4. Problem formulation and solution
- D5. Progression to self-learning: To gain experience of and to develop skills independently of structured class work
- D6. Comprehension of professional literature: to read and to use literature sources appropriate to the discipline to support learning activities

**Assessment strategy:** The programme learning outcomes are achieved by using a range of assessment techniques across the modules at different levels. The programme requires the application of fundamental concepts and theory, often expressed in mathematical language to practical engineering situations. The

assessment strategy reflects this requirement with coursework assignments used to allow students to develop understanding of concepts and explore their understanding through task according to level, practical examinations that ensure that these concepts can be applied with an appropriate level of reflection and traditional examinations where theory and application can be combined under controlled conditions. Group work activities and projects are used to develop a wider range of skills such as team work, project work and research methodology. Students are encouraged to communicate concepts and findings through reports and presentations.

The mixture of examination/practical/coursework tasks reflects the broad and specific aims/objectives of the programme to introduce key concepts and domain knowledge and to develop skills in the selection and application of relevant tools and methods

**Student support:** The College offers a specialised computing facility alongside the general College provision. There is a general PC computing laboratory running Windows and two specialist computing labs. The specialist laboratories are equipped with the specific software for Engineering students; including Software Design Tools development environment, CAD, mathematics and statistics packages to support the taught program. The specialist Computing laboratories are designed to target the discipline taught in that area.

The College provides a user support Helpdesk. The Helpdesk provides first line support to the users.

## **Part B: Programme Structure**

### **Year 1**

The student must take 120 credits from the modules in Year 1.

### **Year 1 Compulsory Modules**

The student must take 120 credits from the modules in Compulsory Modules.

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UFMFEG-30-0	Engineering Experimentation 2020-21	30
UFMFBG-30-0	Foundation Mathematics: Algebra and Calculus 2020-21	30
UFCFGK-30-0	Professional and Academic Skills 2020-21	30
UFCEXX-30-0	Program Design and Implementation 2020-21	30

**Year 2**

The student must take 120 credits from the modules in Year 2.

**Year 2 Compulsory Modules**

The student must take 120 credits from the modules in Compulsory Modules.

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UFMFN3-30-1	Design, Materials and Manufacturing 2021-22	30
UFMFF3-15-1	Energy and Thermodynamics 2021-22	15
UFMFJ9-30-1	Engineering Mathematics 2021-22	30
UFMFG3-15-1	Fluid Dynamics 2021-22	15
UFMFH3-30-1	Stress & Dynamics 2021-22	30

**Year 3**

The student must take 120 credits from the modules in Year 3.

**Year 3 Compulsory Modules**

The student must take 120 credits from the modules in Compulsory Modules.

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UFMFMC-30-2	Automotive Technology 2022-23	30



UFMF88-30-2	Design and Electromechanical Systems 2022-23	30
UFMFL8-15-2	Dynamics 2022-23	15
UFMFK9-15-2	Engineering Mathematics 2 2022-23	15
UFMFHA-15-2	Project Management 2022-23	15
UFMFQA-15-2	Stress Analysis 2022-23	15

#### Year 4

The student must take 120 credits from the modules in Year 4.

#### Year 4 Compulsory Modules

Students must take 30 credits from: UFMFNC-30-3 Automotive Manufacturing or UFMFT9-30-3 Motorsport Performance

Module Code	Module Title	Credit
UFMFNC-30-3	Automotive Manufacturing 2023-24	30
UFMFU7-15-3	Computational Methods 2023-24	15
UFMFC95-15-3	Entrepreneurial Skills 2023-24	15
UFMFXD-30-3	Individual Project BEng 2023-24	30
UFMFT9-30-3	Motorsport Performance 2023-24	30
UFMFXJ-15-3	Vibrational Dynamics 2023-24	15

#### Year 4 Optional Modules

The student must take a minimum of 15 credits from the modules in Optional Modules.

Module Code	Module Title	Credit
UFMFYJ-15-3	Control Engineering 2023-24	15
UFMFU6-15-3	Composite Engineering 2023-24	15

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UFMFD7-15-3	Energy Technologies 2023-24	15
UFMF7K-15-3	Materials and Structures for Special Applications 2023-24	15
UFMFP9-15-3	Mechanics of Materials 2023-24	15

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### **Part C: Higher Education Achievement Record (HEAR) Synopsis**

Designed in conjunction with key national and multi-national employers, this programme provides graduates with the mix of skills and capabilities required by Omani industry for the specification, design and delivery of mechanical and vehicle engineering systems and solutions, including control systems, as required by the manufacturing industries, transport, heavy vehicles, plants, and other industries. Delivered in a way that develops technically competent individuals who think and communicate effectively and who can conduct inquiry, solve problems, undertake critical analysis and deliver effective and fully loaded automotive systems solutions in a constantly changing Omani business context. It provides a solid foundation for lifelong learning, emphasising the development of knowledge, skills and professional values essential to the practice of systems development.

### **Part D: External Reference Points and Benchmarks**

The following reference points and benchmarks have been used in the design of the programme:

QAA UK Quality Code for HE

National qualification framework

Subject benchmark statements

College strategies and policies

Staff research projects

QAA subject benchmark statements:

All modules in the programme have been written to conform to the learning outcomes required by the Engineering Council UK. This is mandatory for accredited engineering programmes.

The specific outcomes are derived from the requirements for electronic and digital engineering described in The IMechE Handbook of Learning Outcomes for BEng and MEng programmes.

The modules have been designed to ensure adequate and appropriate coverage of these outcomes across the levels of study.

SEEC level descriptors have informed the design of the assessment of the learning outcomes.

College strategies and policies:

This programme addresses the College strategies through the following:

To produce “Able and Ready to Work Graduates”

To develop Distinctive Curriculum.

To establish assessment and feedback processes that enhance and deepen learning..

To promote research-informed education and evidence-based practice that supports an increasingly diverse student body.

To sustain and extend approaches to learning that further enhance the employability of GCET graduates and the career destinations they are able to reach.

To use technology and the campus environment to further enhance the student learning experience and teaching effectiveness within the context of a larger and more diverse student population

Staff research projects:

Research and industrial collaborations are key to several modules including UFMFHA-15-2, UFMFMC- 30-2, UFMFNC-30-3, and UFMFX8-30-3.

Employer interaction and feedback:

The College works with a number of industrial partners through the Industrial Consultative Committee. Feedback from employers through their sponsored students also helped in the design of this programme. The programme provides part-time and flexible options which ensure an ongoing interaction with regional employers.

The methods that have been used in the development of this programme include:

Consultation with the Ministry of Higher Education in the Sultanate of Oman.

Consultation with the Ministry of Manpower in the Sultanate of Oman and, in particular, the Engineering human resources needs.

Consultation with the University of Sultan Qaboos, the only public University in the Sultanate of Oman.

Consultation with the Directorate of Technical Vocation Education.

Feedback from students sponsored by different industries.

Consideration of the statistics from the National Center for Statistics and Information in the Sultanate of Oman.

Consideration of Oman's Ninth Five-Year Development Plan (2016-2020) where manufacturing has been identified as the top sector for development.

**Part E: Regulations**

Approved variant to University Academic Regulations and Procedures