Programme Specification

Mechanical Engineering and Vehicle Technology {Foundation} [Feb][FT][GCET][4yrs]

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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 andongoing 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 web-site 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.

Module Code	Module Title	Credit
UFMFEG-30-0	Engineering Experimentation 2019-20	30
UFMFBG-30-0	Foundation Mathematics: Algebra and Calculus 2019-20	30
UFCFGK-30-0	Professional and Academic Skills 2019-20	30
UFCEXX-30-0	Program Design and Implementation 2019-20	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.

Module Code	Module Title	Credit
UFMFN3-30-1	Design, Materials and Manufacturing 2020-21	30
UFMFF3-15-1	Energy and Thermodynamics 2020-21	15
UFMFJ9-30-1	Engineering Mathematics 2020-21	30
UFMFG3-15-1	Fluid Dynamics 2020-21	15
UFMFH3-30-1	Stress & Dynamics 2020-21	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.

Module Code	Module Title	Credit
UFMFMC-30-2	Automotive Technology 2021-22	30

UFMF88-30-2	Design and Electromechanical Systems 2021-22	30
UFMFL8-15-2	Dynamics 2021-22	15
UFMFK9-15-2	Engineering Mathematics 2 2021-22	15
UFMFHA-15-2	Project Management 2021-22	15
UFMFQA-15-2	Stress Analysis 2021-22	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 2022-23	30
UFMFU7-15-3	Computational Methods 2022-23	15
UFCF95-15-3	Entrepreneurial Skills 2022-23	15
UFMFXD-30-3	Individual Project BEng 2022-23	30
UFMFT9-30-3	Motorsport Performance 2022-23	30
UFMFXJ-15-3	Vibrational Dynamics 2022-23	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 2022-23	15
UFMFU6-15-3	Composite Engineering 2022-23	15

UFMFD7-15-3	Energy Technologies 2022-23	15
UFMF7K-15-3	Materials and Structures for Special Applications 2022-23	15
UFMFP9-15-3	Mechanics of Materials 2022-23	15

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