Programme Specification

Mechanical Engineering and Technology {Foundation} [GCET]

Version: 2024-25, v2.0, Validated

Contents

Section 1: Key Programme Details

Part A: Programme Information

Programme title: Mechanical Engineering and Technology {Foundation} [GCET]

Highest award: BEng (Hons) Mechanical Engineering and Technology

Interim award: BEng Mechanical Engineering and Technology

Interim award: DipHE Mechanical Engineering and Technology

Interim award: CertHE Mechanical Engineering and 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: Yes

Credit recognition: No

School responsible for the programme: CATE School of Engineering, College of Arts, Technology and Environment

Professional, statutory or regulatory bodies: Not applicable

Modes of delivery: Full-time, Sandwich

Entry requirements: Applicants holding the following qualifications are eligible to apply for entry to Level 0 of the programme:

Thanawiya amma (General Secondary School Certificate) or the one year certificate with an overall mark of 70%, or above

Thanawiya amma (General Secondary School Certificate) with an overall mark of 65% or above PLUS a mark of over 60% in each stage of the GCET Foundation Studies Programme.

PLUS
A minimum overall score of IELTS 5.5, or equivalent

Further details of entry requirements for applicants holding the IB Diploma or A Levels can be found at http://www1.uwe.ac.uk/whatcanistudy/applyingtouwe/undergraduateapplications/entryrequirements.aspx

**Applicants holding more advanced qualifications may be considered for entry to the programme with advanced standing on an individual basis through the accredited learning.

For implementation from: 01 September 2021

Programme code: H39A13

Section 2: Programme Overview, Aims and Learning Outcomes

Part A: Programme Overview, Aims and Learning Outcomes

Overview: The curriculum is designed for students seeking an engineering education closely aligned to engineering practice. Technical knowledge, engineering practice, business awareness and sustainability are integrated through projects and revisited to produce confident graduates able to apply their skills to novel situations and create engineering solutions that benefit society.

Professional development is placed at the heart of the curriculum. From day one, students are taken on a journey from student engineer to graduate engineer, preparing them for life as an engineering professional. Students will identify, develop and demonstrate competencies expected of a professional engineer in the workplace. Projects and activities, embedded throughout the curriculum, are designed to develop the engineering habits of mind such as: Problem-finding,

Problem-solving, Visualising, Systems Thinking, Improving, and Adapting. Foundation principles of engineering science, skills and practice are integrated throughout all years of study.

Mechanical engineers are employed throughout the engineering sector in the creation, maintenance and improvement of engineering operations. Consequently mechanical engineering graduates need to be able to integrate engineering knowledge skills from across engineering and be able to be an effective member of a multidisciplinary team. Mechanical engineering topics of engineering analysis, design, structures, stress analysis, dynamics, materials, thermofluids, systems and manufacturing are developed throughout the core and taken to an advanced level in the optional modules. Sufficient electrical and electronic content has been included in the core programme for the study of engineering problems involving electromechanical and mechatronic systems with the option of further studying advanced artefacts.

The ability to work in multidisciplinary teams on projects that require a broader view of the role of engineering in industry and society is developed through the core programme using project weeks to bring
students together in problem finding and solution spaces where students are able to interact with each other, academics and external practitioners.

The integration of knowledge, skills and practice allows the tacking of real engineering challenges and encourage students to engage with the wider role that mechanical engineers and specifically engineering
habits of mind can play in tackling global challenges. This is an accessible and modern engineering curriculum designed to attract students from diverse backgrounds able to see the future role of engineering and technology in industry and society.

Programme is delivered in full-time and part-modes of study. We have a number of flexible entry routes to the programme that promote industrial collaboration and the advancement of working individuals.

The programme has 3 pathways to allow students to select their specialism within the field of mechanical engineering and its related technologies, these are Vehicle Technology, Manufacturing and Mechatronics. The design of the programme, and in particular the focus on the development of engineering habits and behaviours required by engineering origanisations of graduate engineers is intended to ensure that the Educational Aims and Learning Outcomes are relevant to full-time learners with limited or no prior experience
of the engineering profession and to those learners who are based in industry either as degree apprentices or as experienced engineers working towards higher academic and professional qualifications.

Features of the programme:

Educational Aims: Be able to work as a graduate mechanical engineer across the engineering sector able to work as an effective member of a multidisciplinary team.

Have acquired the knowledge and understanding of scientific principles and methods necessary to underpin an education in engineering. The programme will provide insight into, and practical skills in, the creation and maintenance of complex engineering products and will explore the environmental impact of engineering.

Have demonstrated an 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 either individually or as part of a team.

Have developed and demonstrated understanding of the competencies and social responsibilities required by a professional engineer in the workplace and society. Activities to scaffold this development are embedded throughout the core curriculum to develop the engineering habits of mind. Consequently, students will be able to critically appraise the value and effectiveness of future engineering innovations in the field in terms of business improvement and environmental sustainability.

Have the requisite academic knowledge, skills and preparation for progression to study for higher degrees in appropriate engineering disciplines.

Programme Learning Outcomes:

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

Programme Learning Outcomes

PO1. Apply established and novel mechanical analysis concepts to solve engineering problems involving design, operations and manufacture that arise across mechanical engineering applications and technologies.

PO2. Model mechanical engineering systems and be able to specify and assess technical designs.

PO3. Describe the manufacturing, financial and marketing implications of design proposals.

PO4. Identify the links between design, manufacturing and production management and assess the capabilities of manufacturing systems software used in the design, maintenance and improvement of manufacturing facilities.

PO5. Communicate and operate effectively either as individuals or as members of a team.

PO6. Pursue independent study and research to undertake enquiry into novel and unfamiliar concepts and implement change in an engineering environment.

PO7. Make considered judgements and decisions on complex engineering issues in which not all facts and consequences are accurately known.

Assessment strategy: This programme uses a range of assessment methods, designed to speak to different leaning styles and to assess not only knowledge and skills but also to develop essential professional attributes such as the ability to work in a group and synthesise work and present it to an audience . While all forms of assessment will be utilised across the full length of studies, the aim is to have students exposed to the full range of assessments and output formats before they reach level 6 of studies, to ensure their performance will not be affected by lack of experience with a new type of assessment.

The assessment regime is designed to scaffold the students' confidence in their

abilities and in the assessment process. For example, at level 4 students will experience in-class tests and on-line tests moving on to formal exams as the programme progresses.

Testing of the knowledge base is through assessed course work, through tasks undertaken under examination conditions, through oral presentations and assessed practical work done in various laboratories. Project work involves both presentation and inquisition. The development of engineering solutions requires demonstration of all of the intellectual skills.

Coursework assignments will be in a mixture of individual and group work and will be assessed by a range of outcomes: written essays providing reflective evaluation of individual or group effort; demonstrations of working systems; high level poster presentations; presentations using digital media capabilities will be utilised to demonstrate student achievement. Technical Reports will also be employed to allow students to present the capabilities of a system that have implemented and critically analyse its potential.

Peer assessment will be employed where group work is assessed. This will allow students to develop more balanced evaluation skills, appreciate the needs of project requirements and dynamics and the limitations of collaborative work. It will also support the building of their professional maturity and appreciation of team and work ethics. Irrespective of the route chosen, throughout the programme there are opportunities for formative feedback as summative assessment is developed, Formative feedback is designed not only to help the students with their learning but also to build their sense of connection and community with their peers and with the academics.

Student support: Teaching and learning strategies to enable learning outcomes to be achieved and demonstrated

The programme learning outcomes are delivered through an appropriate mix of lecture, tutorial and practical lab-based sessions supported by directed independent

learning. Throughout the delivery, fundamental mechanical engineering principles are explored and consolidated through practical lab-based learning. The development of design and modelling skills is embedded in a number of modules at each level. Group work activities and projects are used to add to the development of academic knowledge with the aim of producing well-rounded individuals who understand the demands of the professional environment the will enter as graduates. At GCET Muscat (Oman), there is a policy for a minimum average requirement of 12 hours/week contact time over the course of the full undergraduate programme. This contact time encompasses a range of face to face activities as described below. In addition a range of other learning activities will be embedded within the programme which, together with the contact time, will enable learning outcomes to be achieved and demonstrated.

In Engineering it is recognized that a higher contact time is desirable and so some laboratory-based modules have an extra factor included in the time calculation which provides more hours. In addition the level 4 and 5 students have timetabled Peer-Assisted Learning hours, where trained level 5 and 6 students (as appropriate) work with groups.

Class Activities

The mode of delivery of a module is determined by its Module Leader, and typically involves a combination of one or more lectures, tutorials, 'lectorials', laboratory classes, group activities and individual project work. Modules are predominantly delivered by means of large group lectures, supported by smaller 'lectorials': classes for groups of 20-30 students to allow a closer interaction and discourse with staff.

Academic Support

Academic advice and support is the responsibility of the staff delivering the module in question. Staff are expected to be available outside normal timetabled hours, either by appointment or during published office hours, in order to offer advice and guidance on matters relating to the material being taught and on its assessment.

Pastoral Care

The College offers pastoral care through two routes:

Academic Personal Tutors: All level 1 students are assigned a Personal Academic Tutor, who is an academic member of staff in their department. Students meet individually with their tutor at least twice a year and also participate in group sessions with the Personal Academic Tutor's tutor group (max size 15) during years 1 and 2. In year 3 project supervisors take on the role of Personal Academic Tutor.

Student Advisers, a team of administrative staff who provide comprehensive, full-time student support service on a drop-in basis or by appointment. Advisers are trained to provide advice on matters commonly of concern, including regulatory and other matters; the Adviser will, when necessary, advise the student to seek advice to from other professional services including the university's Centre for Student Affairs or from members of academic staff.

Progression to Independent Study

Many modules require students to carry out independent study, such as research for projects and assignments, and a full range of facilities are available to help students with these. The philosophy is accordingly to offer students both guided support and opportunities for independent study. Guided support, mainly in the form of timetabled sessions, takes the form of lectures, tutorials, seminars and practical laboratory sessions. Students are expected to attend all sessions on their timetable, and this is especially important because of the high content of practical work in the programme.

The progression to independent study will also be assisted by the nature of the support offered in individual modules. Typically, module leaders will provide a plan for the module indicating the activities to be carried out and the forms of learning to be undertaken during the delivery of the module, with a view to encouraging students to plan ahead and to take responsibility for managing their time and resources.

Description of the teaching resources provided for students

The College offers a specialised facilities alongside the general College provision. There is a general PC computing laboratory,CAD laboratory, Mechanical Workshop and specialied laboratory,and Electrical and Electronics laboratory. The specialist laboratories are equipped with the specific software packages as well as hardware to support the taught program.

Professional Practice and Lab Facilities

Students on Engineering programmes can access a suite of specialist laboratories.These include CNC Lathe Machine, Universal Testing Machine Hardness Tester Computerized , Whirling of Shafts machines ,Pendulum Impact Testing Machin,Vibration Testing machine, Microcontrollers and Microprocessors,Mechanics Testing Machines,Fluid Dynamics testing labs ,Energy and Thermodynamics labs Electrical and Electronics labs.

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 Centre

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.

Engineering Support Centre

The Engineering Support Centre provides the students support related to Engineering modules. The students had opportunity to get one-to-one support on any module during the scheduled support sessions for the module.

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 2024-25	30
UFMFBG-30-0	Foundation Mathematics: Algebra and Calculus 2024-25	30
UFCFGK-30-0	Professional and Academic Skills 2024-25	30
UFCEXX-30-0	Program Design and Implementation 2024-25	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 2025-26	30
UFMFF3-15-1	Energy and Thermodynamics 2025-26	15

UFMFJ9-30-1	Engineering Mathematics 2025-26	30
UFMFG3-15-1	Fluid Dynamics 2025-26	15
UFMFH3-30-1	Stress & Dynamics 2025-26	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
UFMF88-30-2	Design and Electromechanical Systems 2026-27	30
UFMFL8-15-2	Dynamics 2026-27	15
UFMFK9-15-2	Engineering Mathematics 2 2026-27	15
UFMFW8-30-2	Heat Transfer, Power and the Environment 2026-27	30
UFMFHA-15-2	Project Management 2026-27	15
UFMFQA-15-2	Stress Analysis 2026-27	15

Year 4
Full time students must take 120 credits from the modules in Year 4.
Sandwich students must take 15 credits from the modules in Year 4.

Year 4 Compulsory Modules (Full-time)
Full-time students must take 60 credits from the modules in Compulsory Modules (Full-time).

Module Code	Module Title	Credit
UFMFU7-15-3	Computational Methods 2027-28	15
UFMFX8-30-3	Engineering Project 2027-28	30

UFCF95-15-3	Entrepreneurial Skills 2027-28	15

Year 4 Compulsory modules (Sandwich)
Sandwich student must take 15 credits form the modules in Compulsory modules (Sandwich).

Module Code	Module Title	Credit
UFMF89-15-3	Industrial Placement 2027-28	15

Year 4 Optional Modules Group 1 (Full-time)
Full-time students must select 30 - 60 credits from Optional Modules Group 1 (Full-time).

Module Code	Module Title	Credit
UFMFYJ-15-3	Control Engineering 2027-28	15
UFMFV8-15-3	Group Design and Integration Project 2027-28	15
UFMFSL-15-3	Integrated Electro-Mechanical Systems 2027-28	15
UFMF7K-15-3	Materials and Structures for Special Applications 2027-28	15
UFMFXJ-15-3	Vibrational Dynamics 2027-28	15

Year 4 Optional Modules Group 2 (Full-time)
Full-time students must select 0 - 15 credits from Optional Modules Group 2 (Full-time)

Module Code	Module Title	Credit
UFMFD7-15-3	Energy Technologies 2027-28	15
UFMFTA-15-3	Thermofluid Systems 2027-28	15

Year 4 Optional Modules Group 3 (Full-time)
Full-time students must select 0 - 15 credits from Optional Modules 3 (Full-time)

Module Code	Module Title	Credit
UFMFU6-15-3	Composite Engineering 2027-28	15
UFMFP9-15-3	Mechanics of Materials 2027-28	15

Year 5
Sandwich students must take 105 credits from the modules in Year 5.

Year 5 Compulsory modules (Sandwich)
Sandwich students must take 60 credits from the modules in Compulsory Modules (Sandwich).

Module Code	Module Title	Credit
UFMFU7-15-3	Computational Methods 2028-29	15
UFMFX8-30-3	Engineering Project 2028-29	30
UFCF95-15-3	Entrepreneurial Skills 2028-29	15

Year 5 Optional Modules Group 1 (Sandwich)
Sandwich students must select 30 - 45 credits from Optional Modules Group 1 (Sandwich).

Module Code	Module Title	Credit
UFMFYJ-15-3	Control Engineering 2028-29	15
UFMFV8-15-3	Group Design and Integration Project 2028-29	15
UFMFSL-15-3	Integrated Electro-Mechanical Systems 2028-29	15
UFMF7K-15-3	Materials and Structures for Special Applications 2028-29	15
UFMFXJ-15-3	Vibrational Dynamics 2028-29	15

Year 5 Optional Modules Group 2 (Sandwich)
Sandwich students must select 0-15 credits from Optional Modules Group 2 (Sandwich).

Module Code	Module Title	Credit
UFMFD7-15-3	Energy Technologies 2028-29	15
UFMFTA-15-3	Thermofluid Systems 2028-29	15

Year 5 Optional Modules Group 3 (Sandwich)
Sandwich students must select 0-15 credits from Optional Modules Group 3 (Sandwich).

Module Code	Module Title	Credit
UFMFU6-15-3	Composite Engineering 2028-29	15
UFMFP9-15-3	Mechanics of Materials 2028-29	15

Part C: Higher Education Achievement Record (HEAR) Synopsis

Graduates of this programme will be equipped with a broad understanding of mechanical analysis and design, combined with knowledge of engineering practice, information technology and project management.

The programme produces graduates with a broad-based ‘systems’ approach to engineering problem solving. Graduates from this programme will be equipped to work in multi-disciplinary teams, able to critically appraise existing ideas and practice and produce creative solutions to engineering problems.

The graduates of the Sandwich study mode in this programme have developed a diverse set of employability skills through the use of a substantive work-based experience and demonstrate an understanding of the connection between academic learning and professional practice.

Part D: External Reference Points and Benchmarks

QAA UK Quality Code for HE

Framework for higher education qualifications (FHEQ)

Subject benchmark statement for Higher Education qualifications in engineering (Feb 2015)

Strategy 2030

University policies

Staff research projects

Relevant PSRB requirements: AHEP3

Industrial Advisory Board

Level 6 Degree Apprenticeship Standard: Manufacturing Engineer

Level 6 Degree Apprenticeship Standard: Aerospace Engineer

Part E: Regulations

Approved to University Regulations and Procedures.