



## **Programme Specification**

### **Building Services Engineering {Foundation} [GCET]**

Version: 2024-25, v2.0, 14 Mar 2024

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## Section 1: Key Programme Details

### Part A: Programme Information

**Programme title:** Building Services Engineering {Foundation} [GCET]

**Highest award:** BEng (Hons) Building Services Engineering

**Interim award:** BEng Building Services Engineering

**Interim award:** DipHE Building Services Engineering

**Interim award:** CertHE Building Services Engineering

**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 Architecture and Environment, College of Arts, Technology and Environment

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

**Modes of delivery:** Full-time, Sandwich

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

**For implementation from:** 01 February 2023

**Programme code:** K29H00

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

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

**Overview:** Graduates can expect to have a choice of established career alternatives (mechanical building services engineer, electrical building services engineer, construction manager, facility manager), as well as a range of emerging and specialist career opportunities. (sustainability engineer, renewable energy design consultant, engineer specialising in lighting, acoustics, fire, security or public health.) This programme has been devised to incorporate elements from across the field, providing students with an excellent foundation on which to found continuing professional development (CPD) and career progression within an employment market that values multi-skilled personnel capable of working in, and managing, diverse engineering environments.

Engineers who pursue a professional career in building services can expect to become involved in a broad range of activities demanding not only a progressive approach to technical innovation, but also a clear understanding of the operational and commercial aspects of the construction industry and the contextual responsibilities to society and the environment.

**Features of the programme:** Inter-professional ethos.

A particular feature of the undergraduate programme at UWE is the interprofessional ethos that runs throughout the modular scheme. Many of the modules on this programme are shared with other UG programmes for Architecture & Environmental Engineering, Architectural Technology and Design, and Construction Management. This is seen as a major strength in curricular terms, as it enables project and group activity to have an inter-professional dimension. The shared modules enable students to pool their distinctive multi-disciplinary knowledge and skills to deliver interprofessional team-driven solutions to live projects, to consider sustainable development issues within the broader built environment. It will also encourage mutual respect for related professions; particularly important in shaping interactions between nascent Architects and Engineers, whose roles have traditionally been seen as distinctive, but with the current challenge of creating sustainable built environments have seen some very significant convergence of professional activity

and technical interest.

Supported by staff with strong links to professional practice. Most undertake professional consultancy work and are active in both professional practice and pedagogic research. Many staff are active researchers in their field of expertise.

Integration of Engineering with Management.

The programme exploits Departmental strengths by integrating a rigorous core of engineering principles and applications with a complementary and parallel strand of management subjects, with emphasis on the management of projects and the deployment of innovative new technology. The importance of graduates being able to progress to higher levels within organisations, and understand the critical imperatives of the commercial environment in the construction industry is clear.

**Educational Aims:** The aim of the programme is to provide an outstanding educational experience that will prepare graduates for related careers in the field of building services engineering, giving them the requisite knowledge, skills, creativity and enthusiasm to make a meaningful contribution to their profession.

The educational aims of the programme are as follows:

Develop the requisite science based knowledge and analytical skills for the formulation of appropriate, effective and sustainable solutions to engineering problems.

Equip graduate engineers with the management skills and personal attributes needed to provide leadership in the work environment, to meet the challenges, and recognise opportunities presented in a Building Information Modelling context.

Give students the self-confidence and judgment needed to take leading roles in decision making.

Provide opportunities to enable engineering students to advance their creative instinct, and apply multi-dimensional thinking in design and problem solving.

Engender in students a sense of enquiry in all aspects of the subject, and provide tools to enable personal research to be undertaken in pursuit of answers to questions, and as a foundation to life-long learning.

Develop such practical competences as are necessary to participate in activity undertaken in the laboratory, the engineering workshop, and the workplace generally.

Enable students to demonstrate competent application of computer based skills, such as engineering simulations and encourage multi-perspective exploration and experimentation with related new technologies.

Provide an understanding of the role played by the building services engineering professions within the context of economic, social and environmental concerns.

### **Programme Learning Outcomes:**

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

#### **Knowledge and Understanding**

- A1. The underlying principles of mathematics, physics and engineering sciences appropriate to the analysis and solution of problems of a specialised nature.
- A2. Characteristics of materials, plant and systems relevant to the field.
- A3. The concepts and principles of sustainable development and environmental performance of buildings
- A4. The needs and behaviour of occupants, clients, and facilities managers in creating and maintaining usable sustainable environments.
- A5. The procedures, parties and relationships involved in design, procurement and management in the built environment with regard to finance, law, quality control, and business practice.
- A6. The social and ethical responsibilities of engineers working in the construction industry, and in the wider society.

- A7. The framework of statutory regulation and codes of practice governing buildings and their engineering systems
- A8. The role of IT in supporting engineers and other construction professionals.

### **Intellectual Skills**

- B1. Apply reflective, critical, analytical and imaginative reasoning in the solution of non-routine technical problems.
- B2. Appraise engineering plant and systems in terms of performance criteria, commercial value, life-cycle, O&M consideration, and end-user acceptability.
- B3. Select and apply a range of analytical methods to define parameters and model physical phenomena.
- B4. Evaluate commercial potential and limitations in a range of engineering activities to determine optimum solutions.
- B5. Formulate persuasive arguments in support of concepts, results, ideas and beliefs
- B6. Communicate, and respond to, critical judgment of the student's and others ideas and perspectives

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

- C1. Select and use scientific and technical equipment to undertake practical experimental investigations into building envelope and system characteristics.
- C2. Select and use specialist applications software and analytical tools in the solution of problems and the production of designs.
- C3. Perform all stages of the preparation of design proposals, including feasibility analysis, sketch and detailed design studies, financial evaluation, installation management, commissioning, and design realisation feedback appraisal.
- C4. Plan, appraise and schedule work to be undertaken in the design, development and construction of buildings and services.
- C5. Maintain a professional approach in matters relating to self-appraisal, personal development, relationships with clients and colleagues, and be able to work effectively at all levels in a team to achieve collective goals.

- C6. Demonstrate accepted standards of conduct and ethics with regard to the environmental, health and safety responsibilities of a professional engineer working in industry.

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

- D1. Identify, access, research, manipulate and interpret data and information.
- D2. Communicate information and ideas orally and using written documents, demonstrating competence with graphical techniques, and electronic media.
- D3. Plan and execute appropriate research methods to illuminate answers and resolve questions
- D4. Engage effectively in inter-personal activity, demonstrate leadership and team-working qualities, chair meetings, record, review, summarise and evaluate arguments, recognise conflict and negotiate to reach optimal outcomes
- D5. Be adaptable to work productively, independently and in unfamiliar environments, and gain maximum benefit from available resources.

**Assessment strategy:** Assessment: By a combination of formal examinations, mostly unseen, technical and laboratory reports, presentations with viva, poster papers, design portfolios, Computer based tests are used to examine mathematical skills at level 1.

Testing of knowledge and understanding is through appropriate forms of assessed coursework and examinations. Assessed coursework includes essays, development projects, technical reports, design portfolios with software outputs, and presentations. Examinations are normally written, both seen and unseen. Some modules include controlled assessment by oral presentation and viva. Computer based tests are used to examine engineering principles in certain modules at level 1.

Assessment: By a combination of formal examinations, mostly unseen, technical and laboratory reports, presentations with viva, poster papers, design portfolios, Computer based tests are used to examine mathematical skills at level 1.

Testing of subject, professional and practical skills is through appropriate forms of

assessed coursework and written examinations. Assessed coursework includes development projects, reports, portfolios, presentations and the production of documentation to professional standards.

Transferable Skills and other attributes: Assessment is predominantly by written technical, management and design reports, presentation of case-studies and assessment of group-working activities, both in design studios and laboratories.

### Student support:

## Part B: Programme Structure

### Year 1

Students must take 120 credits from the modules in Year 1.

#### Year 1 Compulsory Modules

Students 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
UFMFAG-30-0	Foundation Mechanics 2024-25	30
UBLMPA-30-0	Foundation Year Project 2024-25	30

### Year 2

Students must take 120 credits from the modules in Year 2.

#### Year 2 Compulsory Modules

Students must take 120 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
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UBLMYS-30-1	Construction Technology and Services 2025-26	30
UBLLWQ-15-1	Engineering Principles (Building Engineering) 2025-26	15
UBLMSS-30-1	Environmental Physics and Materials 2025- 26	30
UBLMPC-30-1	Law, Economics and Management 2025-26	30
UFMFYG-15-1	Mathematics for Civil and Environmental Engineering 2025-26	15

### Year 3

Students must take 120 credits from the modules in Year 3.

### Year 3 Compulsory Modules

Students must take 120 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
UFMFF7-15-2	Applications of Mathematics in Civil and Environmental Engineering 2026-27	15
UBLMTB-30-2	Building Services Applications 2026-27	30
UBLMH8-15-2	Energy Transformations 2026-27	15
UFCF95-15-3	Entrepreneurial Skills 2026-27	15
UBLMRT-30-2	Procurement and Contract Practice 2026-27	30
UBLLYF-15-2	Sustainability and Energy Simulations 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 student must take 120 credits from the modules in Compulsory Modules (Full time).

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UBLLXE-30-3	Design Project 2027-28	30
UBLLYV-30-3	Dissertation A 2027-28	30
UBLMGP-15-3	Energy Management and Performance Evaluation 2027-28	15
UBLMHP-15-3	Interactive Systems and Comfort Controls 2027-28	15
UBLMPB-30-3	Mechanical Services 2027-28	30

**Year 4 Compulsory modules (Sandwich)**

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

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UFMF89-15-3	Industrial Placement 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 90 credits form the modules in Compulsory Modules (Sandwich).

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UBLLXE-30-3	Design Project 2028-29	30
UBLLYV-30-3	Dissertation A 2028-29	30
UBLMPB-30-3	Mechanical Services 2028-29	30

**Year 5 Optional Modules (Sandwich)**

Sandwich students must take 15 credits from the modules in Optional Modules (Sandwich).

<b>Module Code</b>	<b>Module Title</b>	<b>Credit</b>
UBLMGP-15-3	Energy Management and Performance Evaluation 2028-29	15
UBLMHP-15-3	Interactive Systems and Comfort Controls 2028-29	15

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

Programme learning outcomes are broadly aligned with UK-SPEC and expressed in terms of knowledge and skills encompassing engineering analysis and design, social and economic context, and engineering practice.

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**

The programme draws on the:

CIBSE Guidance Notes to the Academic Content Requirements for Degree in Building Services Engineering. Stated requirements regarding academic content and skills development have been rigorously implemented. The future accreditation of the programme is seen as a critical requirement, and the team are confident that this objective will be satisfied by the programme as proposed.

QAA Engineering/Building and Surveying benchmark statements. The generic statements expressed in QAA subject benchmarks for engineering are largely derived from the Engineering Council's statements of output standards for competence in the engineering professions, and to this extent need not be

considered in isolation. Reference to the QAA benchmark statements for construction, property and surveying has been made to confirm that no significant omissions or contradictions have been made in compiling the generic or programme specific learning outcomes, or in the strategies adopted for teaching, learning and assessment across programmes.

Engineering Council UK Standard for Professional Engineering Competence. The output statements, as interpreted by the professional body to be approached for accreditation, the Chartered Institution of Building Services Engineers, have been the critical driver for both generic and programme specific learning outcomes. Skills matrices have been compiled to demonstrate comprehensive inclusion of the broad range of outcomes over the modular structure are based on these statements.

UWE Bristol, Strategy 2020 Through its constituent teaching and learning elements, assessment strategies, practical focus and learning outcomes, the programme intends to support the achievement of the workstreams defined in the UWE Bristol Strategy 2020. Specifically, the programme will contribute to the strategic ambitions of outstanding learning (Work-stream 1) and developing ready and able graduates (Work-stream 2).

UWE Bristol, Sustainability Plan 2013-2020 The principles of sustainable design and development are core principles of the programme and embedded in most modules as specific learning outcomes, meeting or exceeding the requirements of the USE Sustainability Plan.

Faculty Technology Enhanced Learning (TEL) Strategy (2012-2017) The delivery of the programme has been informed by the Faculty's TEL policy on teaching, learning and assessment including a strong emphasis on formative work, skills development and innovative approaches to teaching and learning.

'Informal' Benchmarking The programme is underpinned by staff consultancy, professional practice and research. The course team have excellent links with local

employers who advise the course team on the content and structure of the programme through the Construction Consortium that meets three times a year.

**Part E: Regulations**

Approved to University Regulations and Procedures.

It is the Award Board's responsibility to determine whether the student's attainment at FHEQ Level 3 is sufficient to progress to Level 4.