# PROGRAMME SPECIFICATION

## PROGRAMME TITLE:
- BEng (Honours) Building Services Engineering with DIS (C277UJ)
- BEng (Honours) Building Services Engineering Part-time (C558UJ)

### 1. AWARDING INSTITUTION/BODY:
UNIVERSITY OF ULSTER

### 2. TEACHING INSTITUTION:
UNIVERSITY OF ULSTER

### 3. LOCATION:
Jordanstown Campus

### 4. PROGRAMME ACCREDITED BY:
Chartered Institution of Building Services Engineers, Institute of Energy

### 5. FINAL AWARD:
BEng (Honours) Building Services Engineering with Diploma in Industrial Studies

### 6. MODE OF ATTENDANCE:
Sandwich, Full-time, Part-time

### 7. SPECIALISMS:
None

### 8. UCAS CODE:
ULS/U20 H222 J BEng/BSE

### 9. QAA SUBJECT UNIT:
11 ENGINEERING

### 10. EDUCATIONAL AIMS AND OBJECTIVES OF THE PROGRAMME
- To provide a caring, supportive learning environment that encourages students to fulfil their potential as students of Building Services engineering, and fosters a commitment to the development of personal transferable skills.
- To reflect appropriate balance between the fundamental principles of Building Services Engineering and the application of engineering principles to real world problems.
- To provide a stimulating and challenging programme that is informed by the research and scholarship of the academic staff.
- To develop, in students, an appreciation of the roles of the engineer in society, in particular awareness of Sustainable Development, and the legislative frameworks within which the professional Building Services engineer and associated disciplines operate.
- To produce Building Services Engineering graduates with the enthusiasm, confidence, flexibility and independence required by a modern profession using changing technologies and which allows them to assume positions of responsibility within the building services engineering industries.

In addition for students on the Diploma in Industrial Studies Programme:
- To enhance an understanding of the work place.
- To develop personal and professional skills.
11. **MAIN LEARNING OUTCOMES**
The programme provides opportunities for students to achieve and demonstrate the following learning.

### 11A SUBJECT RELATED QUALITIES
The student demonstrates Knowledge and Understanding of:

**K1** the mathematical methods and scientific principles appropriate to Building Services engineering

**K2** IT and Communications (ITC) relevant to Building Services engineering

**K3** the processing, property enhancement and characteristics of the internal and external elements of buildings

**K4** general principles of design and the design techniques employed in Building Services engineering

**K5** procurement and management practices

**K6** the social context of Sustainable Development within which the Building Services engineer operates and the professional and ethical responsibilities exercised

**K7** energy and environmental issues

**Learning and Teaching Methods:**
Knowledge and understanding of the subject are acquired mainly through lectures, tutorials, practical work carried out in the laboratory, field and studio, directed reading, case studies, seminars, and IT based resources.

**Assessment Methods:**
Assessment of the above is principally through formal closed book examinations, class tests and coursework assignments consisting of reports on laboratory and field work, essays, individual and group design exercises, a major individual project dissertation and oral/poster presentations.

### 11B INTELLECTUAL QUALITIES
The student is able to:

**I1** analyse and solve a range of Building Services engineering problems using appropriate mathematical methods and scientific principles

**I2** select and use appropriate computer based methods for modelling and analysing engineering problems

**I3** formulate creative solutions to problems through the synthesis of ideas from a range of sources

**I4** undertake technical and commercial risk evaluation

**I5** plan, conduct and report on a programme of original research.

**Learning and Teaching Methods:**
These qualities are developed through exercise classes/tutorials, coursework assignments, individual and group studio design work, simulation exercises and project.

**Assessment Methods:**
The above are assessed through formal examinations, class tests and more open ended coursework assignments consisting of a range of design work, problem simulation, poster and oral presentations/interviews and project dissertation.
**PROFESSIONAL /PRACTICAL SKILLS**

The student is able to:

**P1** undertake experimental laboratory work using relevant test and measurement apparatus.

**P2** employ appropriate mathematical methods to analyse and/or model a range of Building Services engineering problems.

**P3** use a range of Building Services engineering dedicated software.

**P4** design Building Services engineering schemes and component parts to a given specification.

**P5** undertake practical testing/evaluation of designs and analyse/ evaluate results.

**P6** research for related literature/information to develop design proposals.

**P7** take account of environmental, legislative, commercial and societal constraints in the design of technical solutions.

**P8** apply appropriate project management techniques to specific problems.

**Learning and Teaching Methods:**

Awareness of Sustainable Development is developed in Year 1, with Case Studies used in subsequent years to enhance this understanding. Professional and practical skills are gained through coursework assignments including laboratory and field work, design/problem solving assignments and studio work undertaken individually or in small groups and a substantial final year research project.

**Assessment Methods:**

Assessment of the above skills is by practical tests including role playing, reports on laboratory, fieldwork and problem simulation, design submissions, and project dissertation. Some aspects are also assessed by formal closed book examination.

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**TRANSFERABLE/KEY SKILLS**

The student is able to:

**T1** manipulate, sort and present data in a variety of ways.

**T2** solve problems using methods based on the evaluation of scientific evidence.

**T3** use general software tools including spreadsheet, wordprocessing and database packages.

**T4** demonstrate creativity and innovation in problem solving.

**T5** work with limited or contradictory information.

**T6** communicate effectively.

**T7** develop skills which allow life long learning.

**T8** employ an engineering approach in the solution of problems.

**T9** manage time and resources.

**T10** work effectively in a team and demonstrate leadership.

**Learning and Teaching Methods:**

Basic IT and communication skills are taught in Year 1. These and the other skills listed above are developed through coursework assignments including the preparation of reports on laboratory and fieldwork, design/problem solving assignments/studio work undertaken individually or in small groups and a substantial final year research project.

**Assessment Methods:**

The above skills are assessed by reports on laboratory, fieldwork and problem simulation, design submissions, a major final year project dissertation along with observation of management simulation exercises and role playing, oral and poster presentations.
Knowledge and Understanding

They will be able to define entrepreneurship, the entrepreneur and the entrepreneurial process.
They will be able to identify steps required to research the potential for an innovative idea, social or community
development or new venture opportunity.
They will be able to examine the key resources for new venture creation.
They will be able to point out the key steps required for exploiting an innovative idea, progressing a social or community
development or setting up a new venture opportunity.

Intellectual Qualities

They will be able to recognise the central role of creativity and innovation in entrepreneurship and, where appropriate, the
core challenges of protecting new ideas.

Professional/Practical Skills

They will be able to discuss the components of a new venture/project and aspects of the planning process.

Transferable/Key Skills

They will be able to recognise the central role of creativity and innovation in entrepreneurship and, where appropriate, the
core challenges of protecting new ideas. For those completing the module that they will be able to manipulate an e-
learning environment.
12 PROGRAMME STRUCTURE AND REQUIREMENTS FOR THE AWARD

- The BEng (Hons) degree with Diploma in Industrial Studies is a thick sandwich programme of 4 years duration. Years 1, 2 & 4 each are comprised of modules totaling 120 credit points studied over 2 semesters. Year 3 is spent in supervised industrial placement.

- The BEng (Hons) degree is a three-year full-time programme. It is identical in academic content to the sandwich programme and is only open to those students who can demonstrate prior work experience of a duration and content equivalent to the Year 3 industrial placement of the sandwich mode.

- The part-time programme is of 5 years duration. Part-time students take 60 credit points of study each year over 3 semesters. Year 1 comprises one half of the Year 1 of the sandwich programme. Exemption for the remainder of the modules is given on the basis of prior learning. See Section 14.2 for the admission requirements for the part-time programme. Years 2 & 3 taken together are identical to Year 2 of the sandwich programme. Years 4 & 5 taken together match the content of Year 4 of the sandwich mode.

### Module Code & Title

<table>
<thead>
<tr>
<th>Module Code &amp; Title</th>
<th>Credit Level</th>
<th>Credit Points</th>
<th>Module Status</th>
<th>Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLD107J1 Electrical &amp; Environmental Eng. &amp; Science</td>
<td>1</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENE101J1 Engineering Fundamentals</td>
<td>1</td>
<td>10</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENE102J2 Engineering Design Tools</td>
<td>1</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MAT126J1 Engineering Mathematics</td>
<td>1</td>
<td>20</td>
<td>C</td>
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</tr>
<tr>
<td>CIV110J2 Engineering Mechanics B</td>
<td>1</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENH115J2 Introductory Health Technology</td>
<td>1</td>
<td>20</td>
<td>C</td>
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<tr>
<td>BLD112J2 Building Elements</td>
<td>1</td>
<td>10</td>
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</tr>
</tbody>
</table>

### Year 2 Sandwich and full-time modes. Years 2 & 3 Part-time mode over 6 semesters

<table>
<thead>
<tr>
<th>Module Code &amp; Title</th>
<th>Credit Level</th>
<th>Credit Points</th>
<th>Module Status</th>
<th>Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENE301J1 Public Health Engineering</td>
<td>2</td>
<td>10</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>CIV333J1 Engineer &amp; Environment</td>
<td>2</td>
<td>10</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>MAT314J1B Mathematics A2</td>
<td>2</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>BLD319J1 Thermophysics &amp; Control Applications</td>
<td>2</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENE302J2 Electrical and Energy Engineering</td>
<td>2</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>BLD318J2 Thermal Plant &amp; Systems</td>
<td>2</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENH308J2 Protection of the Environment</td>
<td>2</td>
<td>10</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>BLD498J2 Innovation-led Entrepreneurship*</td>
<td>2</td>
<td>10</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

### Year 3 Sandwich mode only.

<table>
<thead>
<tr>
<th>Module Code &amp; Title</th>
<th>Credit Level</th>
<th>Credit Points</th>
<th>Module Status</th>
<th>Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLD321J4DIS Placement: Environmental Engineering</td>
<td>2</td>
<td>60</td>
<td>C DIS on award of Degree</td>
<td></td>
</tr>
</tbody>
</table>

### Year 4 Sandwich mode. Year 3 full-time mode. Years 4 & 5 Part-time mode over 6 semesters

<table>
<thead>
<tr>
<th>Module Code &amp; Title</th>
<th>Credit Level</th>
<th>Credit Points</th>
<th>Module Status</th>
<th>Awards</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIV513J1 Construction Management A</td>
<td>3</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENE501J1 Environmental Engineering Design A</td>
<td>3</td>
<td>10</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENE505J1 HVAC &amp; Energy Systems</td>
<td>3</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENE509J4 Dissertation</td>
<td>3</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENE503J2 Environmental Engineering Design B</td>
<td>3</td>
<td>10</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>CIV520J2 Environmental Engineering 4</td>
<td>3</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>ENE510J2 Energy Systems and Management</td>
<td>3</td>
<td>20</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

* See “Entrepreneurship”
13 SUPPORT FOR STUDENTS AND THEIR LEARNING

Students and their learning are supported in a number of ways:

- A comprehensive induction for new students regardless of entry level.
- Programme handbook and module booklets.
- Access for students to the Course Director and academic staff.
- Student representation on the course committee.
- Opportunity to address general programme concerns through the student/staff consultative committee.
- Personal studies advisors allocated to each student.
- Opportunity for feedback on academic progress at the end of each semester.
- Guidance and information on safety-related matters.
- Facilities and assistance offered by the library and computer services (ISD).
- Student e-mail accounts and full access to the Internet.
- Department of Student Affairs provides services in the fields of accommodation, health, counselling & guidance, careers, childcare, finance & special needs.
- The Careers Service, in conjunction with programme teams, provides careers advice and the preparation for Industrial Placement.
- University has protocols for assessment of students with disabilities.
- Student membership and participation in Professional Bodies (CIBSE, InstE, CIWEM) is encouraged.
- Students Union, in conjunction with the International Office, runs an orientation course for overseas students.

14 CRITERIA FOR ADMISSION TO THE PROGRAMME

Applicants must satisfy the University’s general entry requirements.

14.1 Published entry requirements for admission to the sandwich and full-time modes are detailed below:

**Year 1 Entry**

**GCE A Level:** 260 points, typically BCC to include Mathematics and an appropriate scientific subject, preferably Physics. Where A Level Physics is not offered, GCSE Physics or Science at grade B is required.

**VCE- Vocational A levels** 260 points to include C @ VCE from 2 single awards or 1 double award in Engineering, Science or Construction.

**EDEXEL/BTEC** National Diploma in Engineering with four distinctions, including Mathematics and (Environmental) Science, and merits in other level N111 units.

**GNVQ at advanced level in the Built Environment** An overall Distinction to include Environmental Science plus either A level Mathematics at grade C or four additional units to include Diagnostic Mathematics, Applied Mathematics and Structural Mechanics.

**Irish Leaving Certificate.** 405 – 465 points, typically BBBBC at Higher level to include Mathematics, and 2 from Physics, Economics, Technology, Geography, Chemistry, Biology, Construction and Engineering.

**NCEA Certificate** An overall average of 65%, including Mathematics and pass all modules.

**NCEA Diploma** An overall average of 55%, including Mathematics.

**Access Programmes** Science or Science/Technology – overall average of 60%.

**Other Qualifications** Applicants with other equivalent qualifications may apply.

**YEAR 2 Entry**

**HND in Engineering** At least six merits at level H to include Mathematics.

**NCEA Diploma** An overall average of 65% with Mathematics.
14.2 Entry requirements for admission to the part-time mode are detailed below

Applicants should normally be over 21 years of age, have at least three years experience in, and currently be employed in an aspect of the Building Services engineering industry. They should normally have a Higher National Certificate in Engineering or Construction studies with merit passes in mathematics and four other analytical subjects, or an equivalent qualification. Direct Entry to Year 2 will be considered on merit.

15 EVALUATING AND IMPROVING THE QUALITY AND STANDARD OF LEARNING AND TEACHING

The following mechanisms are used:

- Formal student feedback is sought on the content and delivery of each module via a module evaluation questionnaire, a free response method or a module forum.
- Upon completion the module team reviews each module. Statistical information, student feedback, content, delivery, assessment methods, resources and proposed enhancements are considered.
- Regular student/staff consultative meetings provide the means of highlighting any difficulties, relating to the programme, experienced by the cohort.
- The course committee considers module evaluations and other student feedback, with matters of concern highlighted for action, as part of the annual subject monitoring.
- Students are given opportunity to be represented at course committee.
- The programme is reviewed periodically by the Joint Board of Moderators of the Institution of Civil Engineers, the Institution of Structural Engineers, and the Chartered Institution of Building Services Engineers, and by the Institute of Energy
- Staff teaching performance is monitored annually through student questionnaires. In addition, staff members participate in peer observation of their teaching.
- Staff appraisal is carried out on a 2 year cycle with attention given to the development needs of the individual staff member.
- There is a faculty Teaching & Learning Committees responsible for co-ordinating developments and initiatives relating to innovative methods for delivery, technology mediated learning, as well as general resource issues. In addition, this committee is responsible for regulating faculty codes of practice relating to programme management and delivery.
- The University has an active Staff Development Unit, which supports and funds specific research/projects into improvement of delivery and overall student experience and, in addition provides specific training/development for staff. Specifically, all new staff members (opportunity is also provided for existing staff) have to pursue a formal teaching qualification (Postgraduate Certificate) and are encouraged to apply for membership of the HEA.
16 REGULATION OF STANDARDS

Assessment rules.

General programme regulations are in accordance with the current University of Ulster “Charter, Statutes, Ordinances and Regulations” and updated annually in the Student Handbook for the programme.

In modules that are assessed by either coursework or written examination, the pass mark is 40%. In modules that are assessed by a combination of coursework and written examination, the pass mark for each assessment element is 40%.

The pass mark for the award of the Diploma in Industrial Studies placement year is 50%; a mark of 40% is sufficient for progression to the next stage of the programme.

Classification Of Final Result

Only level D modules contribute to the Honours classification. Each module is weighted in proportion to its credit point rating.

The following percentages are used as a basis for determining a candidate’s overall classification:

<table>
<thead>
<tr>
<th>Class</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>At least 70%</td>
</tr>
<tr>
<td>Class II (division i) (IIi)</td>
<td>At least 60% and less than 70%</td>
</tr>
<tr>
<td>Class II (division ii) (IIii)</td>
<td>At least 50% and less than 60%</td>
</tr>
<tr>
<td>Class III</td>
<td>At least 40% and less than 50%</td>
</tr>
</tbody>
</table>

In order to be considered for a particular class of Honours degree, a candidate must normally have obtained marks in the appropriate range or above in at least 50% of the modules taken in the final level of the programme.

Award of Diploma in Industrial Studies

The following are the minimum percentages used in determining the overall gradings of candidates.

<table>
<thead>
<tr>
<th>DIS</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass with Commendation</td>
<td>At least 70%</td>
</tr>
<tr>
<td>Pass</td>
<td>At least 50% and less than 70%</td>
</tr>
</tbody>
</table>

External Examination

One External Examiner is appointed for the programme. His/her term of office is normally 4 years. The role of the External Examiner is to moderate and approve examination papers and other forms of assessment, ensure that academic standards are maintained and that individual students are treated fairly. The External Examiner is required to submit a report on the standard of the programme, assessment and student performance, comparability of these standards with those of similar programmes, and the administration of the assessment schemes and processes. Detailed duties are as specified in the current University of Ulster “Code of Practice for External Examiners”.
17. INDICATORS OF QUALITY RELATING TO LEARNING AND TEACHING

- Teaching staff within the Faculty of Engineering, and School of the Built Environment are encouraged to become accredited members of the HEA.
- As well as teaching, most staff are actively engaged in research that informs their teaching. In addition, most have substantial industrial experience prior to joining the University. A significant number are full members of appropriate professional bodies (e.g. CEng, MCIBSE, MInstE, MICE, MCIWEM, MIMechE, CGeol, CMath).
- In the 2001 Research Assessment Exercise staff teaching on the programme contributed to Unit 33 “Built Environment” gaining a score of 5.
- All honours degree students normally obtain a suitable one year industrial placement for their DIS year either locally or internationally. Exemption is granted only to those students who can demonstrate equivalent prior experience.
- Graduates from the programmes have substantially better employment prospects than those from other subject disciplines. Most will have paid employment within industry within 3 months of graduation.
- The programmes are accredited by the Joint Board of Moderators, including the Chartered Institution of Building Services Engineers (CIBSE), and the Institute of Energy (InstE). The most recent accreditation visit was in November 2003.
<table>
<thead>
<tr>
<th>MODULE</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODE</td>
<td>TITLE</td>
</tr>
<tr>
<td>ENE10</td>
<td>Engineering Fundamentals</td>
</tr>
<tr>
<td>BLD1</td>
<td>Electrical &amp; Env. Eng. Science</td>
</tr>
<tr>
<td>MAT1</td>
<td>Engineering mathematics</td>
</tr>
<tr>
<td>ENH1</td>
<td>Intro. Health Technology</td>
</tr>
<tr>
<td>CIV11</td>
<td>Engineering Mechanics B</td>
</tr>
<tr>
<td>BLD1</td>
<td>Building Elements</td>
</tr>
<tr>
<td>ENE10</td>
<td>Engineering Design Tools</td>
</tr>
<tr>
<td>ENE30</td>
<td>Public health engineering</td>
</tr>
<tr>
<td>CIV33</td>
<td>Engineer &amp; environment</td>
</tr>
<tr>
<td>MAT3</td>
<td>Mathematics A2</td>
</tr>
<tr>
<td>BLD3</td>
<td>Thermal Plant &amp; Systems</td>
</tr>
<tr>
<td>BLD3</td>
<td>Thermophysics &amp; Controls</td>
</tr>
<tr>
<td>ENH3</td>
<td>Protection of the Environment</td>
</tr>
<tr>
<td>BLD4</td>
<td>Entrepreneurship Awareness*</td>
</tr>
<tr>
<td>BLD3</td>
<td>DIS Placement: Env.</td>
</tr>
<tr>
<td>CIV51</td>
<td>Construction management A</td>
</tr>
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<td>ENE50</td>
<td>Environmental Eng Design A</td>
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<td>CIV52</td>
<td>Environmental Engineering 4</td>
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<tr>
<td>ENE51</td>
<td>Energy Systems and Management</td>
</tr>
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</table>

* See “Entrepreneurship”