

B.Eng. (Hons)

# Civil and Construction Engineering

## B.Eng. (Hons) in Civil and Construction Engineering

### Programme Specification

|    |                                                           |                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----|-----------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Final award title(s)                                      | B.Eng.(Hons) in Civil and Construction Engineering |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2  | Intermediate award title(s)                               | N/A                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3  | Awarding Institution                                      | Applied Science University                         |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 4  | Department                                                | Civil and Architectural Engineering                |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 6  | Delivery site(s) for course(s)                            | Applied Science University                         |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 7  | Mode(s) of delivery/Credit Value                          | Full-time/150 Credit hours                         |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 8  | Approval dates:                                           | Course(s) validated                                |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|    |                                                           | Course specification last updated and signed off   |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|    |                                                           | Version number/date                                |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 9  | Professional, Statutory and Regulatory Body accreditation | HEC ( <i>Pending</i> )                             |                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 10 | Reference points:                                         | Internal                                           | <ul style="list-style-type: none"> <li>ASU Mission Statement and Strategic Plan;</li> <li>ASU Core Skills Policy;</li> <li>ASU Academic Regulations</li> </ul>                                                                                                                                                                                                                                                                            |
|    |                                                           | External                                           | <ul style="list-style-type: none"> <li>Subject Benchmark Statement for Engineering;</li> <li>Framework for Higher Education Qualifications (QAA 2001);</li> <li>SEEC Credit Level Descriptors 2001;</li> <li>ECUK UK Standard for Professional Engineering Competence;</li> <li>ECUK The Accreditation of Higher Education Courses;</li> <li>Joint Board of Moderators, Guidelines for Accredited MEng and BEng (Hons) Courses</li> </ul> |

## Distinctive features of Programme

This Programme prepares students for a career as a civil and construction engineer. The Programme embraces recent industry developments, in particular the introduction of ECUK UK Standard for Professional Engineering Competence (UK-SPEC), and gives students the opportunity to achieve the professional status of Chartered Engineer. The curriculum emphasises the development of traditional engineering numerical strengths coupled with an enquiring creative approach as required by employers. Developing the latter approach is sometimes culturally difficult but it is our aim to get students to eventually approach with relish a blank sheet of paper and an ill-defined, uncertain brief to which they can develop a rational solution. We do seek to educate, rather than to merely train.

Because civil engineering is such a broad area, there are lots of different specialisms for students to consider after graduating, but our degree will give students a solid foundation for entering any of them.

## Programme aims

The BEng (Honours) Civil and Construction Engineering aims to:

- Produce graduates who are committed to a career in civil engineering and construction industry with a range of employers in a variety of countries.
- Produce graduates equipped for postgraduate study and to take up responsible professional employment in the construction industry and become lifelong learners with an appreciation of the value to society of an education in civil engineering.
- Produce graduates who have a breadth and depth of knowledge and understanding of the key aspects of civil engineering.
- Allow graduates to acquire and develop analytical and problem-solving skills, and subject-specific skills. To acquire and develop the ability to evaluate evidence, arguments and assumptions, to reach sound judgements and communicate effectively.
- Develop graduates who approach design problems creatively and who have the technical skills to see their ideas through to realisation.
- Create an educational environment that benefit from practical experience.
- Provide an engineering education, centred within the built environment that recognises the important roles of other professions in the development of the built environment and cultivates interaction and teamwork with these other professionals.
- Provide graduates with the necessary academic qualification which equips them to enter advanced postgraduate study thus satisfying an approved Programme of further learning comprising the full educational base for a Chartered Engineer.

## Programme outcomes

The Programme outcomes have been developed with reference to the JBM guidelines, UK-SPEC, and the benchmark statement for Engineering (*E*). They are also summarised in the Output Standards Specification provided for the Joint Board of Moderators.

### **A: Students will have knowledge and understanding of:**

- A1 Mathematics as a means of communicating results, concepts, and ideas that are relevant to civil engineering (*E*).
- A2 The fundamental concepts, principles, and theories of civil and structural engineering (*E*).
- A3 The concepts, principles and theories of structural analysis, geo-technics, hydraulics, and design to an advanced level (*E*).
- A4 Information and Communications Technology relevant to civil and construction engineering (*E*).
- A5 The general principles of engineering design and construction and the application of specific design techniques to particular elements and systems (*E*).
- A6 The characteristics and behaviour of engineering materials (*E*).
- A7 Management and business practices that are relevant to the construction industry (*E*).
- A8 The role of the civil engineer in society, including the global and social context of the built environment (*E*).
- A9 Sustainability issues and the importance of civil engineering to the quality of the environment. (*E*).
- A10 Health and safety issues, risk assessment, quality issues and regulatory frameworks (*E*).
- A11 Context in which engineering knowledge can be applied.

### **Teaching and learning strategy:**

Acquisition of A1, A2 and A6 is through a combination of lectures, seminars, tutorials, practical classes, coursework, design, and project work at Levels 4 and 5. Acquisition of A3 is through lectures, tutorials, coursework, and project work at Level 6 of the Programme. Acquisition of A4 is through a combination of lectures and practical work at Level 4. This is developed further in the majority of courses at all levels of the Programme either through formal classes or self-directed study. Acquisition of A5 is through a combination of lectures, studios, seminars, individual and group-based design exercises at all levels, and the use of self-directed CAD tutorials. Acquisition of A7 is through a combination of lectures, seminars, tutorials, student role-plays, discussion of students' current work-based problems, coursework, and project work at all levels of the Programme. Acquisition of A8,

A9, A10 and A11 is through lectures (including those from practising engineers), seminars, fieldwork, site visits, coursework, and projects at all levels of the Programme.

Throughout the Programme students have course guides relevant to each topic of study, giving additional reading material which students are encouraged to use for private study to consolidate the formal learning process, and both broaden and deepen their knowledge and understanding in the subject area.

**Assessment:**

Testing of the knowledge base is through a combination of unseen written examinations (A1, A2, A3 and A5), problem-solving exercises (A1, A2, A3 and A4), essays (A7, A8 and A10), oral presentations (A2, A4, A5, A7 and A8), student-led seminars (A5, A8, A9 and A10), design exercises (A2, A3, A5, A9, A10 and A11), laboratory reports (A2, A3 and A6), poster displays (A5, A8, A9 and A10), and individual and group projects (A2, A3, A4, A5, A7, A8, A9 and A11).

**B: Students will develop their intellectual skills such that they are able to:**

- B1 Use mathematical methods to analyse engineering problems (*E*).
- B2 Analyse and solve engineering problems (*E*).
- B3 Design engineering elements and whole systems to meet a need, critically evaluate, and make improvements (*E*).
- B4 Apply engineering knowledge and understanding in the solution of problems and the development of designs (*E*).
- B5 Undertake research, obtain and evaluate primary and secondary data (*E*).
- B6 Plan, conduct and report on an individual research Programme.
- B7 Be aware of all the relevant frameworks in solving problems and designing systems, taking into account financial aspects, risk analysis and environmental impact (*E*).
- B8 Use creativity and innovation in designing solutions.

**Teaching and learning strategy:**

Intellectual skills are developed through the teaching and learning Programme. Analysis and problem-solving skills are further developed through regular tutorial sheets. Experimental, research, and design skills are further developed through coursework exercises, laboratory and fieldwork, and research and design projects. Individual feedback is provided to students in all work submitted.

**Assessment:**

Analysis and problem-solving skills are assessed through unseen written examinations, critiques and viva voce examinations. Experimental, research, and design skills are assessed through laboratory reports, coursework exercises, project reports, poster displays and oral presentations.

**C: Students will acquire and develop practical skills such that they are able to:**

- C1 Carry out safely a series of planned experiments (E).
- C2 Use laboratory and field work equipment to generate data (E).
- C3 Analyse experimental results and determine their validity and accuracy (E).
- C4 Prepare technical reports.
- C5 Give technical presentations using a variety of media.
- C6 Prepare technical drawings including the use of CAD and freehand sketching.
- C7 Use the library, internet and other sources effectively (E).
- C8 Use computer packages (E).
- C9 Manage projects efficiently (E).
- C10 Use surveying equipment.

**Teaching and learning strategy:**

Practical skills are developed through the teaching and learning course. Experimental and fieldwork skills (C1 to C3) are developed through laboratory experiments, fieldwork and project work. C4 and C5 are taught in the *Engineering Practice and Design* course at Level 4 and further developed in reports and presentations throughout the Programme. C6 is taught at Level 4 and further developed through design coursework exercises. C7 is taught through project work. C8 and C9 are taught and developed through coursework exercises and project work. C10 is taught in the Surveying course.

**Assessment:**

Practical skills are assessed through laboratory experiment reports, coursework exercises, project reports and presentations.

**D: Students will acquire and develop transferrable skills such that they are able to:**

- D1 Communicate effectively - oral presentations, report writing, drawing (E).
- D2 Apply mathematical skills.
- D3 Work independently.
- D4 Manage time and work to deadlines (E).
- D5 Use Information and Communications Technology (E).
- D6 Work constructively as a member of a group (E).
- D7 Manage tasks and solve problems, transfer techniques and solutions from one area to another, apply critical analysis and judgement (E).
- D8 Learn effectively for the purpose of continuing professional development and in a wider context throughout their career (E).

**Teaching and learning strategy:**

Transferable skills are developed through the teaching and learning Programme. D1 is taught at Level 4 and developed in coursework and presentations. D2 is taught formally at Levels 4 and 5 and developed throughout the Programme. D3 is supported through the provision of course guides. D4 is developed through setting coursework deadlines. D5 is developed through laboratory experiments, project work, presentations and individual

learning. D6 is developed in laboratory work, fieldwork and group project work. D7 is developed in the technical subject areas of the Programme. Although not explicitly taught, other skills are nurtured and developed throughout the Programme which is structured and delivered in such a way as to promote this.

**Assessment:**

D1 is assessed by coursework exercises, laboratory and field study reports, presentations and oral examinations. D2 is assessed through unseen written examinations and coursework. D4 is assessed by applying penalties for failure to meet deadlines. D5 is formally assessed in the *Engineering Practice and Design* course and further assessed throughout the Programme where ICT is used. D6 is assessed in group work projects. D7 is assessed through unseen written examinations, coursework exercises, design work, and individual and group project work. The other skills are not formally assessed.