

**College of Engineering 2022 - 2023  
BEng (Hons) Civil Engineering  
Module Descriptors**

<b>Module Title &amp; Code</b>	<b>Mathematics 1 ASU_S_MA1</b>
<b>Description</b>	The module is designed to provide students with the mathematical knowledge and skills to support the study of engineering and the requirement for entry into the BEng courses at ASU. Therefore, it is a preparatory or foundation module building on the knowledge obtained at school.
<b>Module Title &amp; Code</b>	<b>Intermediate English ASU_S_IEN</b>
<b>Description</b>	A 10 CAT module which runs for one semester of 15 weeks for three hours per week. It is the first credit English course that ASU undergraduate students are required to take. The course provides intensive practice in upper-intermediate reading, oral presentations, writing, and note-taking. Academic and study skills are embedded in the course. The course develops students' English language and analytical skills to pursue a more advanced ASU academic English course and cope with the literacy demands of specialised courses taught in English.
<b>Module Title &amp; Code</b>	<b>Principles of Engineering ASU_S_POE</b>
<b>Description</b>	This module develops the students' understanding of essential scientific principles for the study of engineering to the degree level. It is designed to be accessible to students with a wide range of prior science specialisations. The module comprises two blocks of study. These blocks are common to all engineering disciplines and introduce the principles of measurement systems and units, thermal physics, mechanical and electrical principles and engineering materials and their properties.
<b>Module Title &amp; Code</b>	<b>Study Skills and Professional Practice ASU_S_SSP</b>
<b>Description</b>	This module provides an introduction to both study and professional skills and practice. The module introduces study skills considering both individual and team-working skills; it covers exam preparation, revision and question answering techniques. It introduces students to their own Personal Development Planning processes. It also enables students to develop and use appropriate safe working practices as expected in an engineering and industrial environment.

<b>Module Title &amp; Code</b>	<b>Engineering Science 1 ASU_S_ES1</b>
<b>Description</b>	This module covers scientific principles of physics and chemistry at a level between secondary school level and Advanced Level. It serves as a preparatory module for students intending to undertake engineering undergraduate degree courses at the University and introduces students to a range of skills required for studying engineering.

<b>Module Title &amp; Code</b>	<b>Laboratory and Workshop Skills ASU_S_LWS</b>
<b>Description</b>	This module is a mixture of workshop exercises and practical experiments and projects. Students work in small groups of 2-5 people, depending on the task. The module also provides students with an introduction to design skills and basic engineering drawing.

<b>Module Title &amp; Code</b>	<b>Engineering Science 2 ASU_S_ES2</b>
<b>Description</b>	This module aims to extend engineering students' science knowledge in preparation for continuing their respective engineering degrees. It covers general applied physical principles, including dynamics, statics, fluids, heat and energy.

<b>Module Title &amp; Code</b>	<b>Computer Programming for Engineering ASU_S_CPE</b>
<b>Description</b>	This module introduces students to concepts of programming. This includes conditional, iterations and block structure. Structure programming and data-types will also be introduced and illustrated on typical and simple engineering problems.

<b>Module Title &amp; Code</b>	<b>Mathematics 2 ASU_S_MA2</b>
<b>Description</b>	The module is designed to provide students with the mathematical knowledge and skills necessary for transition to Level 4 study of engineering subjects. Students will attend lectures and tutorials where worked exercises are undertaken. Where possible, the statistical content will introduce the use of statistical packages and the presentation of real-life data sets. All students will keep a logbook of the problems tackled. Besides the 36 contact hours, students are encouraged to spend some time on their own to practise the mathematical concepts they learn during the lectures and solve extra problems.

<b>Module Title &amp; Code</b>	<b>Constructing the Built Environment ASU_S_CBE</b>
<b>Description</b>	This module introduces students to design principles and processes specific to constructing the built environment. It will explore traditional and modern construction methods, and students will understand how new methods and materials can sustain the built environment.

<b>Module Title &amp; Code</b>	<b>Advanced English ASU_S_AEN</b>
<b>Description</b>	A 10 CAT module which runs for one semester of 15 weeks for three hours per week. It is the second credit English course that ASU undergraduate students are required to take. The course provides intensive practice in Advanced level reading, oral presentations, writing, and listening. Academic and study skills are embedded in the course. This course aims to enhance students' English and analytical skills as a prerequisite for academic and professional success.

<b>Module Title &amp; Code</b>	<b>Human Rights ASU_S_HUR</b>
<b>Description</b>	<p>This module deals with the basic principles of human rights in terms of the definition of human rights and its scope and source, focusing on the provisions of the international law of human rights, which include the following international documents:</p> <ol style="list-style-type: none"> <li>a. Charter of the United Nations</li> <li>b. The Universal Declaration of Human Rights</li> <li>c. The International Covenant on Civil and Political Rights</li> <li>d. The International Covenant on Economic, Social and Cultural Rights</li> <li>e. Convention against Torture and Cruel, Inhumane Punishments.</li> <li>f. Protection Mechanisms and Constitutional Organisation of Public Rights and</li> <li>g. Freedom in the Kingdom of Bahrain</li> </ol>

<b>Module Title &amp; Code</b>	<b>Bahrain Civilisation and History ASU_S_BCH</b>
<b>Description</b>	The aim of the module is to highlight the role of the Kingdom of Bahrain in its local, regional and international levels through various historical eras, beginning with the Old Ages through the Islamic era to the modern era. The module demonstrates the Arab and Islamic identity of the Kingdom of Bahrain and the vital role they play politically and culturally.

<b>Module Title &amp; Code</b>	<b>Arabic Language ASU_S_ALA</b>
<b>Description</b>	The module runs for one semester of 7 weeks (Summer Semester). The module provides intensive practice in reading, oral presentations, writing, and note-taking.

<b>Module Title &amp; Code</b>	<b>Arabic Language for Non-Arabic Speakers ASU_S_ALN.</b>
<b>Description</b>	The module runs for one semester of 7 weeks (Summer Semester). This Arabic course is required to be taken by non-Arabic speaking students in ASU undergraduate Engineering programmes. The module provides intensive practice for beginners in reading, oral presentations, writing, and note-taking.

<b>Module Title &amp; Code</b>	<b>Engineering Practice and Design 1 ASU_4_EP1</b>
<b>Description</b>	This module provides an introduction to engineering practice and design. Design activities, sustainable design principles, and transferable skills will be considered.

<b>Module Title &amp; Code</b>	<b>Structural Design ASU_4_SDG</b>
<b>Description</b>	Introduction to stress and deformation of basic structural materials subjected to axial, torsional, bending, and pressure loads. Plane stress, plane strain, and stress-strain laws. Applications of stress and deformation analysis to members subjected to centric, torsional, flexural, and combined loading. Introduction to theories of failure.

<b>Module Title &amp; Code</b>	<b>Engineering Mathematics 1 ASU_4_EM1</b>
<b>Description</b>	This module consolidates the mathematical skills that underpin the BEng Engineering Degrees.

<b>Module Title &amp; Code</b>	<b>Principles of Engineering Science 1 ASU_4_PE1</b>
<b>Description</b>	<p>This module develops the students' understanding of essential scientific principles for the study of engineering to the degree level. It is designed to be accessible to students with a wide range of prior science specialisations.</p> <p>This module develops the students' understanding of methods for quantifying the forces between bodies. Forces that are responsible for maintaining equilibrium. This module is common to all engineering disciplines and introduces the principles of measurement systems, force and moment vector and traditional analysis, and forces in equilibrium.</p>

<b>Module Title &amp; Code</b>	<b>Surveying and Structures 1 ASU_4_SS1</b>
<b>Description</b>	This module introduces students to principles of surveying and Setting out, including distance and angular measurements, levelling, volume and curve calculation, dimensional control and positioning. The students will use various surveying instruments, including tapes, levels, and Theodolite/Total Stations. The students are also introduced to modern advances in surveying technology, such as GPS and LASERS and their uses in civil engineering and construction. Knowledge is acquired through computational exercises and the completion of practical survey work.
<b>Module Title &amp; Code</b>	<b>Civil Engineering Drawing and Surveying ASU_4_CDS</b>
<b>Description</b>	Civil Engineering Drawing - Rationale, Documentation, standards, Use of CAD or BIM software to produce structural engineering drawings in concrete and steel. Interpret Civil Engineering Drawings for structures, roads and drainage. Civil Engineering Survey - Theory and practice in the use of surveying instruments as applied to Civil Engineering and Construction projects. Calculations and Survey techniques.
<b>Module Title &amp; Code</b>	<b>Engineering Practice and Design 2 ASU_4_EP2</b>
<b>Description</b>	The module covers practical work, project management, health and safety and risk management, and transferable skills.
<b>Module Title &amp; Code</b>	<b>Engineering Mathematics 2 ASU_4_EM2</b>
<b>Description</b>	This module consolidates the mathematical skills that underpin the BEng Engineering Degrees.
<b>Module Title &amp; Code</b>	<b>Principles of Engineering Science 2 ASU_4_PE2</b>
<b>Description</b>	This module develops the students' understanding of essential scientific principles for the study of engineering to the degree level. It is designed to be accessible to students with a wide range of prior science specialisations. The module comprises two blocks of study. These blocks are common to all engineering disciplines and introduce mechanical and electrical principles and engineering materials and their properties.

<b>Module Title &amp; Code</b>	<b>Surveying and Structures 2 ASU_4_SS2</b>
<b>Description</b>	This module develops students' practice with structural engineering, provides an introduction to structural concepts, and provides an overview of specific techniques for analysing determinate structures, trusses, beams, and frames.
<b>Module Title &amp; Code</b>	<b>Engineering Ethics ASU_4_EET</b>
<b>Description</b>	This module introduces the theory and the practice of engineering ethics using a multi-disciplinary and cross-cultural approach. The theory includes ethics and the philosophy of engineering. Historical cases that were taken primarily from the scholarly literature on engineering ethics and hypothetical cases were examined and critically evaluated by students linking to the codes of engineering ethics set by different professional bodies. Students will compare these cases and recommend action.
<b>Module Title &amp; Code</b>	<b>Soil Mechanics ASU_4_SME</b>
<b>Description</b>	This module introduces a number of simple models which were used to describe soil and its mechanical behaviour. Standard laboratory tests were carried out, and soil properties were derived from the results.
<b>Module Title &amp; Code</b>	<b>Advanced Engineering Mathematics ASU_5_AEM</b>
<b>Description</b>	This module covers advanced undergraduate engineering mathematics.
<b>Module Title &amp; Code</b>	<b>Design and Construction 1 ASU_5_DC1</b>
<b>Description</b>	This module offers the knowledge and skills of masonry and reinforced masonry structure design to Eurocodes, analysis of structural form and the ability to design in both qualitative and quantitative directions.
<b>Module Title &amp; Code</b>	<b>Hydraulics ASU_5_HYD</b>
<b>Description</b>	This module develops the fundamental principles of Fluid Mechanics and applies them to practical applications of analysis and design. Students will develop a greater understanding of the flow of ideal and real fluids and will apply these principles to the analysis and design of pipes and open channels. Students will perform simple laboratory tests and prepare a formal report.

<b>Module Title &amp; Code</b>	<b>Structural Mechanics ASU_5_STM</b>
<b>Description</b>	This module introduces Building Information Modelling (BIM) and explains how BIM has changed the construction industry worldwide. Case studies of projects where BIM improved sustainability and reduced cost were studied. Students model typical multi-storey framed steel and concrete buildings in Autodesk Revit and apply appropriate variable actions on the floors. They transfer the building model to the Autodesk Robot Structural Analysis programme and analyse design beams and columns. They compare computer results to hand calculations results, obtained using load take-down methods and design formulae.

<b>Module Title &amp; Code</b>	<b>Environmental Engineering ASU_5_EEG</b>
<b>Description</b>	This module takes the principles of environmental engineering and applies them to practical applications of analysis and design. Students will be introduced to the principles of water, water quality, and wastewater treatment processes and to consider sustainability issues. Students will develop an understanding of the hydrological cycle and surface hydrology, and apply these principles to the calculation of precipitation and unit hydrograph. Students will also learn the basics of groundwater flow and the problem of contamination in groundwater. The unit also introduces air pollution and noise pollution.

<b>Module Title &amp; Code</b>	<b>Infrastructure and Highway Engineering ASU_5_IHE</b>
<b>Description</b>	This is substantially a theory and project-based module. It brings together construction, design, contractual, planning, management and safety processes. It emphasises the link between materials and site geological properties and their relationship with design and execution. Highway engineering will occupy half the contact time, and this will include geometric and structural design aspects, which will integrate some geology, earthwork and drainage. The module will also include site visits. Standard laboratory tests were carried out, and bitumen properties were derived from the results. Problems to be solved include geometric design, traffic volume, channelisation, and hydrology. Lab projects involve roadway designing.

<b>Module Title &amp; Code</b>	<b>Engineering Management and Economics ASU_5_EME</b>
<b>Description</b>	<p>This module helps to prepare students for their future roles as professional engineers in a number of ways. It includes:</p> <ul style="list-style-type: none"> <li>• detailed study of project planning techniques, including network techniques, with preparation for the student's individual projects</li> <li>• an overview of the business functions which interact with engineering</li> <li>• an introduction to Systems Thinking. A formal method for studying systems will be introduced.</li> <li>• An introduction to recruitment, retention and equal opportunities in employment</li> <li>• the use of published Standards in engineering</li> <li>• use of the BSI website to access national and international standards</li> <li>• an introduction to statistics and their use in managing engineering processes</li> <li>• an introduction to Quality Management, with particular reference to the ISO 9000 series</li> <li>• An introduction to European Directives and harmonised standards</li> <li>• Writing technical business reports, including the importance of acknowledging published sources and the use of formal methods for doing so</li> </ul>
<b>Module Title &amp; Code</b>	<b>Internship ASU_5_ITS</b>
<b>Description</b>	<p>This module provides the students with an opportunity to experience the industrial world and be part of a team working on real-world projects. The University assists each student in finding the most suitable industry.</p>
<b>Module Title &amp; Code</b>	<b>Design and Construction 2 ASU_5_DC2</b>
<b>Description</b>	<p>This module offers the knowledge and skills of marine structures, analysis and design of Eurocodes, analysis of structural form and the ability to design in both qualitative and quantitative directions - including ports and offshore structures and dams.</p>
<b>Module Title &amp; Code</b>	<b>Advanced Structural Analysis and Design ASU_5_ASD</b>
<b>Description</b>	<p>This module develops students' practice with structural engineering, introduces structural concepts, and provides an overview of specific techniques for analysing indeterminate structures beams, and frame structures.</p>



<b>Module Title &amp; Code</b>	<b>Theory of Structures ASU_5_THS</b>
<b>Description</b>	<p>This module mainly deals with the <b>matrix-stiffness</b> analysis of structures. It begins with a review of the basic concepts of structural analysis and matrix algebra and shows how the latter provides a mathematical framework for the former.</p> <p>This is followed by detailed descriptions and demonstrations through many examples of how matrix methods can be applied to linear static analysis of skeletal structures (plane and space trusses; beams and grids; plane and space frames) by the stiffness method.</p> <p>Also, it is shown how simple structures can be conveniently solved using a reduced stiffness formulation, involving far less computational effort. Finally, the Finite Element Analysis is discussed.</p>

<b>Module Title &amp; Code</b>	<b>Civil Engineering and Construction Field Study ASU_5_CCF</b>
<b>Description</b>	<p>The module introduces students to the practical side of the civil and construction engineering industry. It gives them the opportunity to visit sites. It ensures that students are aware of real-life situations in projects. Students will be able to critically appraise and evaluate construction management situations and report on them.</p>

<b>Module Title &amp; Code</b>	<b>Structural Design and Analysis 1 ASU_6_SA1</b>
<b>Description</b>	<p>This module offers the knowledge and skills of reinforced concrete design to Eurocodes, analysis of structural form and the ability to design in both qualitative and quantitative directions.</p>

<b>Module Title &amp; Code</b>	<b>Civil Engineering Materials ASU_6_CEM</b>
<b>Description</b>	<p>The module provides an overview of general civil engineering material performance requirements and properties: strength, stiffness, durability, and appearance. This will include concrete, steel, and timber. The module will provide an overview of available materials, geotextile functions and mechanisms, designing with geotextiles, stresses in materials and biaxial stress systems.</p>

<b>Module Title &amp; Code</b>	<b>Foundations ASU_6_FDS</b>
<b>Description</b>	Shallow foundations design. Bearing capacities of soils, safe, net and ultimate; factor of safety; mass concrete footings; footing resisting lift; column type footings. Two-way footing concentrically or eccentrically loaded; AS 3600 code requirements; design loads; critical section for shear; punching shear and bending shear, anchor bolts. Combined footings; design of strap or cantilever footings. Design of mat foundations. Design of retaining walls. Design of reinforced retaining walls. Sheet pile walls design. Residential footings design.

<b>Module Title &amp; Code</b>	<b>Innovation, Enterprise and Management ASU_6_IEM</b>
<b>Description</b>	<p>The module is intended to be practical, with students developing some appropriate ideas of their own in such a way that they become practical, profitable propositions. Students will practice ways of finding ideas, testing those ideas and developing them, and will write their own business strategies, risk assessments and scenario testing so that they demonstrate the commercial viability of their ideas.</p> <p>One of the assignments will require students to work in groups, typically to adopt a concept and develop it such that it could be commercially viable and sustainable. This might be a product or a service (such as consultancy or contract management).</p> <p>Students will experience topics addressing intellectual property, market research, market placement, advertising and finance. They will be expected to reflect on what they can contribute to a group.</p>

<b>Module Title &amp; Code</b>	<b>Engineering System Design ASU_6_ESD</b>
<b>Description</b>	To involve the student in the process of engineering project development from planning to detailed design and working with a project team.

<b>Module Title &amp; Code</b>	<b>Engineering Research Methods ASU_6_ERM</b>
<b>Description</b>	The module studies the scope and significance of engineering research. It introduces students to the various aspects of engineering research; its types, tools and methods and students will learn how to apply research techniques to real-world situations. The module covers topics such as the identification of a topic by the student, proposition of hypothesis, formulation of research inquiries, development of literature review, and select research design and methodologies. Additionally, students will learn data collection techniques; primary and secondary data with application to specific problems, scaling and research instrument design and sampling design.
<b>Module Title &amp; Code</b>	<b>Current Topics in Civil and Construction Engineering ASU_6_CTC</b>
<b>Description</b>	The module introduces students to new issues, ideas and trends in the civil and construction engineering industry. It ensures that students are kept up-to-date with developments. Students will experience topics addressing Building Information Modelling, 3D Printing, Smart analyses of Buildings and Smart Cities, Modular Construction, Plastic Roads, Sustainability issues, and other related matters.
<b>Module Title &amp; Code</b>	<b>Geotechnical Engineering ASU_6_GTE</b>
<b>Description</b>	This module shows how the soil mechanics theories introduced in <i>Soil Mechanics</i> are applied to the solution of a number of geotechnical analyses and design problems.
<b>Module Title &amp; Code</b>	<b>Structural Design and Analysis 2 ASU_6_SA2</b>
<b>Description</b>	This module offers the knowledge and skills of steel design to Eurocodes, analysis of structural form and the ability to design in both qualitative and quantitative directions.
<b>Module Title &amp; Code</b>	<b>Construction Management ASU_6_CMG</b>
<b>Description</b>	This module prepares students with the ability to critically appraise and evaluate the performance of the construction industry and shed light on the role of construction management.
<b>Module Title &amp; Code</b>	<b>Project ASU_6_PRJ</b>
<b>Description</b>	To plan, execute, review and report upon a piece of project work related to the BEng course being followed by the student. A Module Guide for the project is augmented by eight lectures.