- **Module Descriptors**

ASU_5_AEM Advanced Engineering Mathematics
This module covers advanced undergraduate engineering mathematics.

ASU_5_DC1 Design and Construction 1
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.

ASU_5_HYD Hydraulics
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.

ASU_5_STM Structural Mechanics
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, analyses, design beams, and columns. They compare computer results to hand calculations results, obtained using load take-down methods and design formulae.

ASU_5_EEG Environmental Engineering
This module takes the principles of environmental engineering and applies them to practical applications of analysis and design. The student 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.

ASU_5_EME Engineering Management and Economics
This module helps to prepare students for their future roles as professional engineers in a number of ways. It includes:

- Detailed study of project planning techniques, including network techniques, with preparation for the student's individual projects
- An overview of the business functions which interact with engineering
- An introduction to Systems Thinking. A formal method for studying systems will be introduced.
- An introduction to recruitment, retention and equal opportunities in employment
- The use of published Standards in engineering
- Use of the BSI website to access national and international standards
- An introduction to statistics and their use in managing engineering processes
- An introduction to Quality Management, with particular reference to the ISO 9000 series

- An introduction to European Directives and harmonised standards.
- Writing technical business reports, including the importance of acknowledging published sources and the use of formal methods for doing so.

ASU_5_IHE Infrastructure and Highway Engineering
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.

ASU_5_DC2 Design and Construction 2
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.

ASU_5_ASD Advanced Structural Analysis and Design
This module develops students' practice with structural engineering, provides an introduction to structural concepts, and provides an overview of specific techniques for analysing indeterminate structures, beams and frame structures.

ASU_5_THS Theory of Structures
This module mainly deals with the matrix-stiffness 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.
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.
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.

ASU_5_CCF Civil Engineering and Construction Field Study
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.

ASU_5_ITS Internship
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.
ASU_6_SA1 Structural Design and Analysis 1
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.

ASU_6_CEM _Civil Engineering Materials
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.

ASU_6_FDS Foundations
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.

ASU_6_ESD Engineering System Design
To involve the student in the process of engineering project development from planning to detailed design and working with a project team.

ASU_6_ERM Engineering Research Methods
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.

ASU_6_IEM Innovation, Enterprise and Management
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.
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).
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.

ASU_6_CTC Current Topics in Civil and Construction Engineering
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

ASU_6_GTE Geotechnical Engineering

This module shows how the soil mechanics theories introduced in Soil Mechanics w applied to the solution of a number of geotechnical analyses and design problems.

ASU_6_SA2 Structural Design and Analysis 2
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.

ASU_6_CMG Construction Management
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.

ASU_6_PRJ Project
To plan, execute, review and report upon a piece of project work related to the BEng programme being followed by the student. A Module Guide for the project is augmented by eight lectures.