ASU_5_AMM Advanced Engineering Mathematics and Modelling

This module covers advanced engineering mathematical techniques used for solving engineering problems, including Computational Techniques in Engineering, Vectors, Differential equations, Selected Numerical and Computational methods, Advanced Matrix computation techniques, and Advanced Computational Optimisation and advanced Statistical techniques, including Permutations and combinations. Binomial, Poisson and normal distributions.

ASU_5_FEA Solid Mechanics and Finite Element Analysis

This module discusses concepts in the deformation of materials building based on knowledge gained in L3 and L4 modules, where the fundamental principles of solid mechanics are applied to more complex systems. The module will provide basic principles of the finite element analysis (FEA) techniques and their application in structural and stress analysis. The module involves a practical component where students use FEA software to implement the theoretical concepts.

ASU_5_MDM Machine Drives and Mechatronics

This module provides the fundamentals of mechanical drives, power transmission systems, microcontrollers and electrical actuation systems. The module has a lab component where students will conduct experiments on mechanical and mechatronic control systems in advanced engineering applications.

ASU_5_DAC Dynamics and Control

The module covers dynamics and classical theory. It extends the treatment of dynamics from point masses to rigid bodies and covers a wider scope of applications of the principles of mechanics. The module also deals with applying various mathematical techniques to the study of dynamics and feedback problems. Additionally, various methods of classical control, such as Bode, Nyquist and Root Locus, will be analysed. The module includes a practical component where students conduct experiments in teams, analyse data, and communicate experimental results in written technical reports to improve their knowledge and understanding of basic concepts of automatic control.

ASU_5_TSE Thermofluids and Sustainable Energy

This module provides further study of heat transfer, fluid mechanics and thermodynamics over the L4 module on Thermodynamics, where the theory needed to allow an industrial-level analysis of processes is presented. The topics include Steam cycles, Air standard cycles, Refrigeration cycles, Turbulence, Combustion and Heat Transfer, heat equation conduction resistance networks, applications, convection and radiation.

ASU_5_END Engineering Design

The first half of this module is designed to extend the student's understanding and ability to appropriately select and then apply a range of design methodologies, computer-aided design tools, and techniques to the solution of engineering design problems. A wide range of problem-solving techniques will be introduced to reinforce the need for a structured approach to engineering design. "Hands-on" experience is offered to the student, including further 2D design work software, with a strong emphasis on 3D parametric modelling and the associated tools widely used in industry.

ASU_5_INT 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_DSM Dynamics and System Modelling

To provide participants with an appropriate way of visualising the complex interrelationships between various parts of real-world problems; problems that continually change over time and are resistant to corrective action. Therefore, the module provides a solid foundation for developing strategies and managing problems for which conventional reductionist ways of thinking are ineffective. The module is subsequently designed to provide the understanding of the following:

- System dynamics and why use it
- The modelling approach/ processes
- The basic feedback structures
- How to develop a system dynamics model.

Therefore, this module introduces the concepts of system dynamics modelling, including the modelling process, fundamental modes of dynamic behaviour, and the stock-flow-feedback structures that generate them, system mapping tools, and modelling human behaviour. Emphasis will be on examples from the energy and water sectors and aquaculture management, but students will have the opportunity to engage with their real-world problems.

ASU_6_PRO Project

The project is a learning experience that enables students to do independent research and bring together many of the concepts they have learned. The work calls for careful planning, critical judgment, engineering competence, and communication skills. Further details are provided in the Individual Project Guide for Students. This guide may be updated from time to time, including information generally on how to plan the project, milestones, important dates, and deliverables. The module will spread over the first and second semesters of Year 4.

ASU_6_IAE Innovation and Enterprise

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. Topics include project management skills which help determine the critical path of a proposed business, such as intellectual property, market research, market placement, advertising and finance. Students will be expected to reflect on what they can contribute to a group.

ASU_6_TTM Thermofluids and Turbo Machinery

This module provides a further study of heat transfer, fluid mechanics and thermodynamics, exploring in-depth internal combustion engines, fluid mechanics governing equations, the performance of various types of pumps and turbines, and application of heat transfer to extended surfaces and heat exchangers. The module involves experiments in teams; on condensation apparatus, boiling heat transfer apparatus, central heating system, refrigeration cycle apparatus, weather station, and four-stroke spark-ignition engine.

ASU_6_MMT Manufacturing Systems and Materials Technologies

This module provides an advanced study on stress analysis, materials behaviours, and process selection. The module also introduces the core concepts of manufacturing systems, manufacturing and operations strategies, manufacturing automation, manufacturing process planning, material handling storage and retrieval. Students will also develop an understanding of the role of robotics in manufacturing and the principles of operations management.