University of Hertfordshire UH

School of Physics Engineering and Computer Science

CATS/ERASMUS Engineering Module List

Contents

This catalog contains the module list for engineering within the School of Physics, Engineering, and Computer Science which is coequally referred to as SPECS. It covers aerospace, automotive, mechanical, civil, robotics and AI, and electrical engineering disciplines. The catalog is ordered by semester with Semester A September to January on pages 2-16. Semester B January to May on pages 16-34.

What do the module codes mean?

Each module is referred to by its identifying code consisting of an initial number (4, 5 or 6) followed by ENT (for aero, auto, civil, RAI, and mech engineering) or ELE (for electrical engineering) and then the specific code of the module itself. The number 4 corresponds to 'Level 4' (first year modules), 5 corresponds to 'Level 5' (second year modules) and 6 corresponds to 'Level 6' (third year level modules). Some modules have duplicates in different engineering disciplines, for example there is a mathematics module in all of the separate disciplines, these will have the specific area of engineering noted in brackets e.g. (Auto) this will allow you to select the subject more relevant to yourself if you have any particular interest in a certain topic.

What are the assessment types?

There are three assessment types listed for each module with the percentage weighting if the type carries weight for the module.
Coursework consists of in-session practical activities, labs, and of course written reports with a set due date.
Tests refer to in-class or in-session tests, typically involving numerical work, taken in near-exam conditions with an allocated time limit.
Examinations are the universities formal assessment type. They are organized and run independently of the module academic team to ensure academic integrity. They take place within an examination period at the end of each semester. This type of assessment may be a requirement of some exchange programs.

How many modules should I study per semester?

Normally, students study 4 modules per semester (each module is worth 15 credits). However, it is possible to study 5 modules in some cases.

If I have any questions about the modules, who should I contact?

Your first point of contact is the Study Abroad Team (studyabroad@herts.ac.uk). They will then either answer your question or pass your enquiry on to the appropriate person.

4AAD0016 Aerospace Technology and Industry

In this module, you will explore basic design, function and performance of the key components and systems of various types of aircraft. Lectures are also given to provide some perspective on the scope and operation of the aerospace industry. Ray Wilkinson, one of the lecturers, has published the book 'Aircraft Structures and Systems'. This book is a very useful source of material related to the module. 4AAD0016 and 4AAD0044 Aerospace Technology and Industry module is a 15-credit module, and it requires 150 hours of student effort.

Module code 4AAD0016
Semester A
15 Credits
Assessment Coursework 40%, Test 60%

4ENT1168 Engineering Mathematics for Aerospace

Mathematics is essential to Engineering and the aim of this module is to ensure that you have the necessary knowledge and understanding of a range of fundamental mathematical techniques required in Engineering Applications. The material covered especially includes techniques which will be required frequently throughout the course. There will be other mathematical tools you will need, but they will be introduced as required and in the context of the particular application.

Module code 4ENT1168
Semester A
15 Credits
Assessment Coursework 0%, Test 40%, Examination 60%

4ENT1169 Mechanical Science for Aircraft Engineering

In this module you will explore the basic principles of mechanics in relation to aircraft structures through its two elements, Statics and Dynamics. Emphasis will be place on simplified explanation of the methodology for a good understanding and confident application of techniques. It is a key first year module building on your background knowledge and expanding and directing this knowledge towards Engineering and Industrial problem solving.

Module code 4ENT1169
Semester A
15 Credits
Assessment Coursework 20%, Test 20%, Examination 60%

4ENT1098 Engineering Fundamentals Mech

This module will guide you through your first steps in engineering, and introduces the building blocks of general engineering – the "nuts and bolts" of what every self respecting engineer should know. But more importantly, it will force you to think and learn for yourself! You will have to do a lot of the learning yourself and we will guide you as you do this. The module is mostly practical, it combines use of specialist software and laboratory activities.

Module code 4ENT1098
Semester A
15 Credits
Assessment Coursework 100%

4ENT1160 Engineering Mathematics Auto and Mech

Mathematics is essential to Engineering and the aim of this module is to ensure that you have the necessary knowledge and understanding of a range of fundamental mathematical techniques required in Engineering Applications. In this module, you will explore mathematical techniques commonly use in the Engineering community.

Module code 4ENT1160
Semester A
15 Credits
Assessment Coursework 0%, Test 40%, Examination 60%

4ENT1161 Statics and Dynamics Auto and Mech

In this module you will explore the basic principles of mechanics through its two elements, Statics and Dynamics. Emphasis will be place on simplified explanation of the methodology for a good understanding and confident application of the techniques. It is a key first year module building on your background knowledge and expanding and directing this knowledge towards Engineering and Industrial problem solving.

Module code 4ENT1161
Semester A
15 Credits
Assessment Coursework 40%, Test 60%

4ENT1162 Automotive Engineering Fundamentals Auto

Throughout this module you will be introduced to the automotive engineering fundamentals; with this, you'll develop a strong foundation of technical knowledge on which you will build through your respective programme. 4ENT1128 Automotive Engineering Fundamentals is a 15-credit module, and it requires around 150 hours of student effort.

Module code 4ENT1162
Semester A
15 Credits
Assessment Coursework 40%, Test 60%

4ENT2043 Engineering Mathematics (EE)

The aims of this module are to acquire the necessary knowledge and understanding of fundamental mathematical techniques required for engineering applications and develop the mathematical concepts required to support other modules in the engineering programmes.

Module code 4ENT2043
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

4ENT2045 Digital Electronic Circuits (EE)

This module complements Circuit Theory and Analysis module by introducing you to digital electronic fundamentals. Common types of switching devices and logic gates are introduced together with some typical circuit implementations and applications of these devices. Fundamental concepts such as binary number systems, binary arithmetic and Boolean logic are also covered, along with some common logical and mathematical 'tools' used in the design of both combinational and sequential digital electronic systems.

Module code 4ENT2045
Semester A
15 Credits
Assessment Coursework 50%, Test 0%, Examination 50%

4ENT2047 Circuit theory and Analysis

The aims of this module are to enable students to develop a strong foundation and understanding of the fundamental principles underpinning electrical and electronic circuits, as well as develop the ability to apply these principles to analyse and solve practical electrical engineering problems. Additionally, this module aims to enable students to develop practical laboratory skills including use of typical equipment to analyse the constructed circuits and gain insight into selected software-based circuit simulation tools.

Module code 4ENT2047
Semester A
15 Credits
Assessment Coursework 50%, Test 50%

4ENT2049 Project Planning and Design (EE CDIO)

The aims of this module are to enable students to develop an understanding of project management techniques and software in engineering design, as well as apply Design principles via EDA and CAD tools in the field of Electrical and Electronic Engineering. Additionally, this aims to enable students to develop employability and professional skills through effective group-working practices, problem solving, communication, and information retrieval skills in the context of electric and electronic engineering.

Module code 4ENT2049
Semester A
15 Credits
Assessment Coursework 100%

4ENT1137 Principles of Sustainable Design and Construction

This module will introduce you to concepts and principles related to design and construction. The module has been designed to have a wide array of different elements of the Civil Engineering profession. For this reason, a rich variety of guest speakers from the industry will be delivering lectures making the link between theory and real case studies. The module is a 15-credit module and it requires around 150 hours of student effort (50 hours will be class contact; 50 hours guided reading and 50 individual reading and effort).

Module code 4ENT1137
Semester A
15 Credits
Assessment Coursework 100%

4ENT2026 Civil Engineering Materials

This module will introduce you to fundamental principles of materials science and construction materials. The module will combine both theory and practice to yield a better understanding of all the concepts and ideas discussed in the class. We will start the module by building a strong foundation on very basic theoretical knowledge of materials science and engineering. Gradually we will start exploring the diverse and versatile nature of construction materials. The module will combine both theory and practice to yield better understanding for all the concepts and ideas discussed in the class.

Module code 4ENT2026
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

4ENT2027 Civil Engineering Practical Geology

The module introduces you to practical geology for Civil Engineers. It covers geological maps and plotting the stratigraphy using desktop-based resources, site investigation methods and techniques, including laboratory and in-situ testing. You will develop an appreciation of site investigation techniques and an understanding of reasons for their application and be able to write a technical report containing relevant soil characteristics/ specifications (e.g. soil classification, compaction, permeability and soil consistency). The module also forms an introduction to the basic theories of soil mechanics and their applications in analyses of geotechnical structures, geological risksand hazards as well as construction methods.

Module code 4ENT2027
Semester A
15 Credits
Assessment Coursework 100%, Test 0%

4ENT2028 Site Surveying and Setting Out

The aims of this module are to enable students to explore the role and importance of the survey operations that occur at each stage of a civil engineering project. Appreciate the theoretical and practical skills necessary to carry out the common survey processes required for civil engineering projects. Review the importance of quality assurance in surveying and its application to civil engineering projects. Work effectively as a member of a team of surveyors and appreciate the different team roles within surveying.

Module code 4ENT2028
Semester A
15 Credits
Assessment Coursework 40%, Test 60%

4ENT2029 Engineering Mathematics

The aims of this module are to enable students to...further their knowledge and understanding of the fundamental mathematical techniques required for engineering applications and develop the mathematical concepts required to support other modules in the engineering programmes.

Module code 4ENT2029
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

4ENT1128 Motorsport and Automotive Technology

Throughout this module you will be introduced to the automotive engineering fundamentals; with this, you'll develop a strong foundation of technical knowledge on which you will build through your respective programme. 4ENT1128 Automotive Engineering Fundamentals is a 15-credit module, and it requires around 150 hours of student effort.

Module code 4ENT1128
Semester A
15 Credits
Assessment Coursework 40%, Test 60%

4ENT2002 Professionalism and Project Management

The aims of this module are to enable students to take responsibility for their own continued professional development and embark on their journey to becoming professional engineers. Be made aware of the different roles and requirements of engineers in the professional world as well as the institutions they must engage with to progress in the next stage of their career, such as Chartership. Work effectively in teams embracing difference and adopting communication, leadership and management strategies to use within their studies and prepare them for their professional career.

Module code 4ENT2002
Semester A
15 Credits
Assessment Coursework 100%

4ENT2016 Fundamentals of Static Systems

The aims of this module are to enable students to improve knowledge and understanding of the mathematical techniques required by engineers. Additionally, this module aims to enable students to develop a fundamental knowledge of statics and strengths of materials.

Module code 4ENT2016
Semester A
15 Credits
Assessment Coursework 50%, Test 50%, Examination 0%

4ENT1175 Digital Electronics (RAI)

Welcome to the course web site for Digital Electronics. This module introduces students to digital electronic fundamentals. Common types of switching devices and logic gates are introduced, as are common circuit implementations using them. Fundamental concepts such as binary number systems, binary arithmetic and Boolean logic are also covered, as are common logical and mathematical 'tools' used in the design of both combinational and sequential digital electronic systems.

Module code 4ENT1175
Semester A
15 Credits
Assessment Coursework 60%, Test 40%

4ENT1176 Maths for Robotics and Artificial Intelligence (RAI)

This module aims to provide students with the knowledge necessary to understand how Artificial Intelligence (AI) techniques, such as machine learning and search, are built on mathematical principles. The Python programming language is used extensively in AI and machine learning, the practical elements of this module involve implementing mathematical techniques in Python.

Module code 4ENT1176
Semester A
15 Credits
Assessment Coursework 25%, Test 25%, Examination 50%

4ENT1177 Introduction to Robotics (RAI)

In this module, you will explore various aspects of robotics ranging from sensors to control principles. The material covered will include accepted terminology, system specifications in terms of task requirements, useful measures of robot performance (i.e payload, repeatability, accuracy, Degrees of Freedom etc.) and examines the main configurations, structures and architectures of both mobile robots and robot manipulators. It will provide knowledge and understanding of the basic principles of commonly used actuators, sensors and robot peripherals. Also, an appreciation of the ways in which robots may be sequentially and continuously controlled and programmed to accomplish typical robot tasks and functions.

Module code 4ENT1177
Semester A
15 Credits
Assessment Coursework 60%, Test 40%

4ENT1178 Robot Design and Build Project A (RAI)

In this module you will design and construct a small robotic platform, develop the ability to manage time and resources effectively, gain an awareness of health and safety practices and the environmental context under which engineers are expected to operate, and develop and practice their ability to communicate in writing. These objectives are designed to provide you with a comprehensive understanding of the technical, practical, and ethical aspects of engineering.

Module code 4ENT1178
Semester A
15 Credits
Assessment Coursework 100%

5ENT1004 Automotive Electrical Systems

The module aims to enable you to explore the main principles and practices in automotive electrical systems, as well as develop an understanding of how various electrical components and systems work and interact; examine the environmental impact of automobiles and how electrical systems can help improve this. This is a 15-credit module, and it requires around 150 hours of student effort. To get started, please study the Module Information provided under Units, as it contains the learning outcomes, reading list and other key information about this module. It will not take long, and it will put you in good stead for the rest of the module. There are 3 hours of timetabled activities each week that will be led by the module staff. These will take the form of a 2-hour lecture and an 1-hour tutorial/demo.

Module code 5ENT1004
Semester A
15 Credits
Assessment Coursework 40%, Test 0, Examination 60%

5ENT1116 Fluid Mechanics (Auto and Mech)

In this module, you will be introduced to fundamental concepts and definitions in Fluid Mechanics and you need to get familiar with the applications of the principles of Fluid Mechanics. 5ENT1116-Fluid Mechanics is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT1116
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

5ENT1117 Thermodynamics (Auto and Mech)

In this module, you will explore fundamental concepts and definitions in thermodynamics, the first and second laws of thermodynamics and basic thermodynamic cycles. 5ENT1117-Thermodynamics is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT1117
Semester A
15 Credits
Assessment Coursework 100%

5ENT1118 Materials in Engineering (Auto and Mech)

In this module you will learn about a wide range of materials and their applications in industry. You will also learn about current research involving materials, and create a research poster based on a materials' science topic of your choice.

Module code 5ENT1118
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

5ENT1128 Fluids and Aerodynamics

Fluid mechanics is the fundamental basics for understanding the flow of fluids. It is the basis of several disciplines of study including aerodynamics, which will also be looked at in this module. Fluids and aerodynamics have a significant impact in aerospace engineering and this module will introduce the fundamentals and then advance onto critical topics for aerospace. 5ENT1128 Fluids and Aerodynamics is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT1128
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

5ENT1129 Thermodynamics for Aerospace

In this module, you will explore thermodynamics concepts and laws and their applications in heat engines, heat pumps, compressor and turbine. This module is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT1129
Semester A
15 Credits
Assessment Coursework 100%

5ENT1130 Materials for Aerospace

This module introduces the students to the fundamentals knowledge of materials used in manufacturing aerospace vehicles and also to a large extent in the engineering industry. The module aims to develop learners' knowledge in understanding materials' physical properties, manufacturing techniques, the selection process for specific applications, and failure analysis. The intended learning outcomes are facilitated through a combination of approaches to learning and teaching; this will include lectures, tutorials, and practical material laboratory. A significant degree of group work is embedded in the assessment to simulate working in the industry. The group work will enable the learner to learn, discuss and challenge other works in a professional manner to enhance their knowledge about aerospace materials.

Module code 5ENT1130
Semester A
15 Credits
Assessment Coursework 100%

5ENT1137 Embedded Systems Design (RAI)

In this module, you will gain sufficient understanding of microprocessors and programmable logic devices to design, build and program simple systems based on their use. 5ENT1137 is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT1137
Semester A
15 Credits
Assessment Coursework 100%

5ENT1139 Behavioural Robotics

The Behavioural Robotics module aims to exposure students to the current trend in this field. The module will firstly explore the emergence of Embodied AI in robotics as a way to overcome some of the limitations of Classic (Good Old Fashioned AI). The course will then explore both Cognitive Robotics and Bio-Inspired Robotics. As well as robotics and engineering elements, the course will also expose the student to some of the phycological, philosophical and biological ideas and principles which have helped inspire and develop this field. By the end of the module the students will be able to: Develop knowledge of control architectures used for behavioural and cognitive robotics. Gain an understanding of the core elements that underpin the design and implementation of behavioural and cognitive robotic architectures. Explore how basic behavioural control architectures can be implemented in an appropriate programming language. This module is highly practical and will involve the use of a range of robotic systems.

Module code 5ENT1139
Semester A
15 Credits
Assessment Coursework 75%, Test 25%, Examination 0%

5ENT1140 Artificial Intelligence Principles

"The branch of computer science that is concerned with the automation of intelligent behavior". Luger and Stubblefield, 1993. In this module you will: learn what AI is; understand AI concepts and terms like machine learning; be exposed to various issues and concerns surrounding AI; also demonstrate AI in action with a mini project.

Module code 5ENT1140
Semester A
15 Credits
Assessment Coursework 25%, Test 25%, Examination 50%

5ENT2011 Applied Thermodynamics

In this module, you will explore fundamental topics in thermodynamics to engineering and technology. This module is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT2011
Semester A
15 Credits
Assessment Coursework 50%, Test 50%, Examination 0%

5ENT2039 Digital Tools for Civil Engineering

This module is a gateway to the exciting world of leveraging digital technologies for solving complex problems and creating innovative solutions in the field of civil engineering. In this module, you will embark on a journey through three distinct yet interconnected sections that will equip you with the skills and knowledge necessary to excel in the modern civil engineering landscape: AutoCAD: We will kick-start the module with a deep dive into Computer-Aided Design (CAD) using the renowned industry-standard software, AutoCAD. Over the course of four weeks, you will learn to transform your creative engineering ideas into precise and detailed engineering drawings. These drawings not only serve as execution commands for projects but also play a pivotal role in conveying ideas clearly to peers, stakeholders, and clients. BIM and Revit: Building Information Modelling (BIM) is revolutionizing the way civil engineering projects are designed, constructed, and managed. In this five-week section, you will explore the world of BIM and its practical implementation using the most famous software like Revit. In addition to having a chance to learn and be skilful in most demanding software of the industry, you will also get to understand the role of BIM in the entire lifecycle of a construction project. Modern Digital Technologies: The final leg of our journey introduces you to the latest advancements in modern digital technologies that are reshaping the civil engineering landscape. From emerging technologies to cutting-edge Tech Insights, you will discover how these technologies are transforming the way we conceptualize, design, and present civil engineering solutions.

Module code 5ENT2039
Semester A
15 Credits
Assessment Coursework 100%

5ENT2040 Mechanics of Materials and Stability

Building up on the 4ENT1183 - Fundamentals of Civil Engineering Structural Analysis module, the aims of this module are: to enable students to explore the theory and application of the principles of mechanics of materials and stability of structures applied to civil engineering. To be able to appreciate how principles of mechanics of materials and stability inform structural design considerations. To understand the analysis of indeterminate structures. 5ENT2040 Mechanics of Materials and Stability module is a 15 credit module and requires about 150 hours of student effort.

Module code 5ENT2040
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

5ENT2041 Hydrology and Open-Channel Hydraulics

Hydrology taken from Greek "hýdōr" for "water" and "lógos" for "study" is the scientific study of movement, distribution, and quality of water, largely on Earth but also considering other planets; such study includes the water cycle, water resources and environmental watershed sustainability. A practitioner of hydrology is a hydrologist, working within the fields of environmental science, physical geography, geology, or civil and environmental engineering. Hydrologists and you as a future professional practitioner use various analytical methods and scientific techniques to collect and analyse data to help solve water-related problems such as urban water supply, environmental preservation, and flood disaster management.

Module code 5ENT2041
Semester A
15 Credits
Assessment Coursework 30%, Test 0%, Examination 70%

5ENT2055 Introduction to Vehicle Aerodynamics

Welcome to this exciting module. The main aims of the module are to enable you to: develop a comprehensive understanding of the principles of fluid dynamics and their application to vehicle aerodynamics, and effectively investigate vehicle aerodynamic performance using appropriate testing techniques; conduct experiments to investigate vehicle aerodynamic performance. This module will introduce you to the fundamental concepts of vehicle aerodynamics, including testing procedures as well as the analytical and computational techniques used to evaluate aerodynamic performance. The module builds a knowledge based on fluid mechanics principles before applying this knowledge in the context of vehicle design for aerodynamic performance. You will gain an understanding of the aerodynamic design sensitivities associated with various road vehicle body types, particularly lift and drag sensitivities relating to different body styles (hatchback, notchback, fastback, squareback/estateback), and subsequently investigate these effects through completion of an assessed wind tunnel laboratory.

Module code 5ENT2055
Semester A
15 Credits
Assessment Coursework 100%

6ELE0066 Digital Signal Processing

This module introduces the students to modern concepts of digital signal processing. Material covered includes typical theoretical concepts as well as an introduction to typical hardware implementations. The theoretical study is supported by practical work using typical software tools for simulating DSP techniques as well as practical work in implementing simple algorithms on selected digital signal processors. 6ELE0066 Digital Signal Processing is a 15-credit module, and it requires around 150 hours of student effort.

Module code 6ELE0066
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1009 Instrumentation and Control Systems

This module is about instrumentation and control systems. During this semester, you will explore measurement error analysis, measurement system components and their functions, sensors and their operating principles, analogue and digital systems, open-loop control systems, closed-loop first and second order systems, frequency response, Nyquist stability criteria and diagrams, control systems performance and Ziegler/Nichols tuning method. Moreover, you will study how to design and simulate a controller, and get familiar with sensors and actuators' characteristics and their selection criteria. This will be carried out by understanding the main uncertainties and practical challenges of sensors and actuators.

Module code 6ENT1009
Semester A
15 Credits
Assessment Coursework 60%, Test 40%

6ENT1027 Microelectronics and VLSI

This module aims to extend students' knowledge of analogue and digital electronics into the area of integrated circuit design. Material is biased toward advanced high speed analogue and digital IC technologies and circuits. Learning is supported by the use of modern relevant software design, hardware and simulation tools. 6ENT1027 Microelectronics and VLSI is a 15-credit module, and it requires around 150 hours of student effort.

Module code 6ENT1027
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1053 Motorsport Engineering VMS

In this module you will explore; racecar engineering, data logging, data analysis, suspension geometry, race car set up, tyre characteristics, aerodynamics and race preparation. The module is supported with a number of laboratories and tutorials including; racecar setup laboratory, data analysis software tutorials, driver in the loop vehicle simulator laboratories and vehicle simulation software tutorials.

Module code 6ENT1053
Semester A
15 Credits
Assessment Coursework 70%, Test 30%

6ENT1067 Vehicle Design

This module aims to enable students to provide experience of automotive design and the interactive requirements of engineering products, extend the student's experience in the detail design and validation of vehicle components, units and systems, and encourage a professional attitude to the application of engineering knowledge and skill, with specific reference to market/customer requirements, aesthetics, performance, cost, safety and legal requirements.

Module code 6ENT1067
Semester A
15 Credits
Assessment Coursework 100%

6ENT1073 Flood Hydraulics and River Engineering

Flood management can cross a variety of timescales, geographic extents, disciplines and techniques. While civil engineers have primacy in determining appropriate infrastructure measures to accommodate flows that exceed the ordinary, social, economic and environmental perspectives and considerations also have significant bearing in determining the appropriateness of solutions. Thus engineers typically focus on design of hydraulic structures, or hydraulic elements of structures, with significant input from political and regulatory arenas.

Module code 6ENT1073
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1074 Advanced Structural Analysis and Design

In this module, you will explore the the design of multi-bay and multi-storey structural systems, from conceptual design to computational modelling of buildings. Stability of structural systems and different analysis types will be covered. Environmental and dynamic actions that commonly act on structures will be studied through practical applications. Special structural elements such as plate girders and pile caps will be assessed as well as the concept of plastic analysis of structures.

Module code 6ENT1074
Semester A
15 Credits
Assessment Coursework 50%, Test 0%, Examination 50%

6ENT1078 Highway and Transportation Engineering

This module introduces and develops the key concepts in highway and traffic engineering. Highways form an integral part of engineering around the world but are also hugely significant to the social, environmental and commercial impacts of countries. We all use roads and footpaths to get around in our daily lives but these are also crucial to the movement of goods, access to services, emergency services, just to name a few. There are two broad elements to highway and traffic engineering: Transport Planning; Highway Design. This module covers both of these elements and leads you through the processes of the decision making required for new or improved highways and then the design work required to provide a suitable highway alignment that meets current design standards.

Module code 6ENT1078
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1132 Aerospace Performance and Propulsion

The aims of this module are to enable students to develop an in-depth understanding of the theory and application of performance analysis of aircraft and their propulsion devices. 6ENT1132 Aerospace Performance and Propulsion is a 15-credit module, and it requires around 150 hours of student effort.

Module code 6ENT1132
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1146 Power Systems

The module is designed to provide relevant and up-to-date key concepts and background knowledge on electrical energy production, delivery and transmission as well as on the operation, stability and control of electric power systems. The module covers the fundamental topics in Electric power system generation, transmission and distribution (conventional and renewable energy sources); Transmission lines components, modelling and parameters calculation; Three phase AC generation, transmission, distribution, and quantitative load analysis; Power flow solution in transmission networks; Power system faults and analysis techniques (per-unit representation); Dynamics of a synchronous generator, steady-state and transient stability analysis.

Module code 6ENT1146
Semester A
15 Credits
Assessment Coursework 40% , Test 0%, Examination 60%

6ENT1152 Connected Autonomous Vehicles (Auto)

This module will be introduced to to the technologies and the emerging area of automotive engineering that is is Autonomous Vehicles (AV's) and Connected Autonomous Vehicles (CAV's). This module will teach you about the types of sensors which you could expect to find on such vehicles as well as about how such vehicle use this information to determine the best course of action on any given driving scenario.

Module code 6ENT1152
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1169 Navigation, Human Factors and Meteorology

This module aims to familiarise you with human factors that affect the operation of aircraft, understand the atmospheric conditions for VFR flight, and understand the principles of aircraft navigation. In addition, the module will allow you to prepare for the theoretical knowledge required for a UK Private Pilot's License (PPL-(A)) and, to a large extent, an EASA PPL(A).

Module code 6ENT1169
Semester A
15 Credits
Assessment Coursework 0%, Test 100%

6ENT1174 Advanced Mechanics

The aims of this module are to enable students to extend their knowledge of the analysis of structural components subjected to complex stress/strain fields with theoretical and analytical approaches. Additionally, this module aims to enable students to develop a systematic understanding for design and analysis of engineering components.

Module code 6ENT1174
Semester A
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1175 Vehicle Design and Body Engineering (Auto and VMS)

This module aims to: provide experience of automotive or motorsport design and the interactive requirements of engineering products; extend the students experience in the detail design and validation of vehicle components, units and systems; encourage a professional attitude to the application of engineering knowledge and skill, with specific reference to market/customer requirements, aesthetics, performance, cost, safety, legal requirements, standards and regulations. The structural analysis section of this module will extend the students skills learnt in previous modules, particularly FEA methods, to the analysis of vehicle bodies including the development of body-in-white modelling, crash worthiness and occupant protection. The Manufacturing section will further extend the students understanding of joining, forming and finishing techniques particularly applied in the modern automotive industry.

Module code 6ENT1175
Semester A
15 Credits
Assessment Coursework 50%, Test 0%, Examination 50%

6ENT1176 Machine Learning (RAI)

In this module, you will gain a sufficient understanding of state-of-the-art approaches in machine learning and you will develop knowledge of typical algorithms used in this field. You will also learn the main concepts related to the training of a data-driven approach that is commonly used today in data science.

Module code 6ENT1176
Semester A
15 Credits
Assessment Coursework 25%, Test 25%, Examination 50%

6ENT1178 3D Vision (RAI)

In this module, you will learn typical Computer Vision techniques, critically assess applications where compute vision is used, to analyse and evaluate immersive visualization and related technologies. The aims of this module are to enable students to develop a deeper understanding and analyse typical Computer Vision techniques, critically assess applications where compute vision is used, such as robotics, and to learn to analyse and evaluate immersive visualization and related technologies. Students will learn to apply techniques of computer vision and to justify use of immersive technologies in related applications.

Module code 6ENT1178
Semester A
15 Credits
Assessment Coursework 0%, Test 100%

6ENT1183 Visual and Spoken interfaces (RAI)

This module introduces the students to modern concepts of visual and spoken interfaces. Material covered includes typical theoretical concepts as well as an introduction to typical interfaces for spoken and visual interaction. The theoretical study is supported by practical work using typical software tools for simulating visual and spoken interface techniques as well as practical work in implementing simple algorithms and tasks.

Module code 6ENT1183
Semester A
15 Credits
Assessment Coursework 100%

6ENT2056 Flight Performance, Planning and Communication

The aims of this module are to enable students to have a comprehensive understanding of the air law, navigation, communications, meteorological conditions and human factors required for flight planning; acquire skills necessary to plan a flight under VFR and IFR rules; acquire skills necessary to communicate correctly over the radio.

Module code 6ENT2056
Semester A
15 Credits
Assessment Coursework 50%, Test 50%

4ENT2031 Fluid Mechanics and Hydraulics (Civil)

The aims of this module are to enable students to: Apply the fundamental principles of fluid mechanics to the solution of common engineering problems involving pipe flows and forces on submerged surfaces. Appreciate the context within which water distribution and asset management are applied in civil engineering

Module code 4ENT2031
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

4ENT1171 Electrical Science for Aircraft Engineering

Many aerospace systems rely on electrical circuits for power, sensing and actuation. This module introduces the principles of electrical circuits and introduces the fundamental concepts of electrical units and relationships, basic AC and DC circuit theory, digital systems, A/D and D/A conversion, and electromechanical principles and devices. In this module, you will explore these general principles of electrical systems. You will also study the specifics as they apply to aircraft, which have a unique set of requirements. 4ENT1171-0105 - Electrical Science for Aircraft Engineering is a 15-credit module, and it requires around 150 hours of student effort.

Module code 4ENT1171
Semester B
15 Credits
Assessment Coursework 0%, Test 100%

4ENT1172 Programming for Aircraft Engineers

The aims of this module are to enable students to develop an understanding of programming in engineering to gain skills to be able to use programming to optimise engineering solutions throughout their studies and into the workplace. Over the course of the module, students will gain relevant programming knowledge and skills to be able to write a script and control a programmable circuit board.

Module code 4ENT1172
Semester B
15 Credits
Assessment Coursework 60%, Test 40%

4ENT1173 Aerospace Engineering Professionalism

This module aims to enable you to take responsibility for your continued professional development and embark on your journey to becoming professional engineers. You will be made aware of the different roles and requirements of engineers in the professional world and the institutions you must engage with to progress in the next stage of your career. You will be explained the importance and details of relevant codes of conduct and legislation so that you can apply those to your career, starting within your current studies. You will learn how to work effectively in teams embracing differences and adopting communication, leadership, and management strategies to use within your studies and prepare you for your professional career.

Module code 4ENT1173
Semester B
15 Credits
Assessment Coursework 60%, Test 40%

4ENT1164 Electrical Science Auto and Mech

Many mechanical systems rely on electrical circuits for power, sensing and actuation. Today's modern vehicles, regardless of being electric vehicles or traditional fuel-based vehicles, are using more electrical/electronic components rather than mechanical components. This module introduces the principles of electrical circuits and introduces the fundamental concepts of electrical units and relationships, basic AC and DC circuit theory, digital systems, A/D and D/A conversion, and electro-mechanical principles and devices. In this module, you will be introduced to: Introduction to the module and Fundamentals of Automotive Electrical Fundamentals, DC Circuit Theory and Analysis, Capacitors and Capacitance, Digital components and Systems.

Module code 4ENT1164
Semester B
15 Credits
Assessment Coursework 70%, Test 30%

4ENT1165 Programming for Engineers Auto and Mech

The aims of this module are to enable students to develop an understanding of programming in engineering to gain skills to be able to use programming to optimise engineering solutions throughout their studies and into the workplace. Additionally, over the course of the module, students will gain relevant programming knowledge and skills to be able to write a script and control a programmable circuit board.

Module code 4ENT1165
Semester B
15 Credits
Assessment Coursework 60%, Test 40%

4ENT1166 Engineering Professionalism Auto and Mech

The aims of this module are to enable students to take ownership for their own continued professional development and embark on their journey to becoming professional engineers. Students to be made aware of the different roles and requirements of engineers in the professional world as well as the institutions they must engage with to progress in the next stage of their career, such as Chartership. Students will explore the importance and details of relevant codes of conduct and legislation so that they can apply this to their careers, starting within their current studies. As part of this module, students will explore how to work effectively in teams embracing difference and adopting communication, leadership and management strategies to use within their studies and prepare them for their professional career.

Module code 4ENT1166
Semester B
15 Credits
Assessment Coursework 100%

4ENT2055 Analogue Circuits and Devices

The aims of this module are to enable students to develop a sound understanding of the physical characteristics of conductor, semiconductor, and insulator materials, as well as develop an in-depth knowledge of operational amplifiers and their applications.

Module code 4ENT2055
Semester B
15 Credits
Assessment Coursework 50%, Test 0%, Examination 50%

4ENT2057 Electronic Product Development (EE CDIO)

This module aims to develop your problem-solving, communication, and information retrieval skills from technical literature, and IT resources and apply them during group working activities to design and implement solutions for electronic circuit design problems. Let's bring innovative electronic products from concept to reality! This module provides a holistic view of electronic product development, encompassing key aspects such as conceptualization, design, prototyping, testing, and manufacturing. Students will actively engage in hands-on projects and collaborative activities throughout the course, fostering teamwork and problem-solving skills. Integrating contemporary tools and methodologies will empower participants to navigate the rapidly evolving landscape of electronic product development, preparing them to meet the demands of an ever-changing industry.

Module code 4ENT2057
Semester B
15 Credits
Assessment Coursework 100%

4ENT2030 Principles of Sustainable Design and Construction

This module will introduce you to concepts and principles related to design and construction. The module has been designed to have a wide array of different elements of the Civil Engineering profession. For this reason, a rich variety of guest speakers from the industry will be delivering lectures making the link between theory and real case studies. The module is a 15-credit module and it requires around 150 hours of student effort (50 hours will be class contact; 50 hours guided reading and 50 individual reading and effort).

Module code 4ENT2030
Semester B
15 Credits
Assessment Coursework 100%

4ENT2032 Fundamentals of Structural Analysis

The aims of this module are to enable students to: Explore the principles of mechanics and application of structural analysis in determining the behaviour of simple structures; Appreciate how fundamental principles of structural analysis will inform more advanced structural design solutions.

Module code 4ENT2032
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

4ENT2033 Engineering Application of Mathematics (CIV)

For Civil engineering, algebra is used on a daily basis, and they work exclusively on differential equations in engineering mathematics, statistics, and calculus. Civil engineers use mathematical equations to study the chemistry of materials. To use the right material for the project, engineers measure the strength of the material and apply chemical equations to judge the strength of the material. Mathematical trigonometry is used for surveying the structure, where land elevation and various angle measurements of the structure are considered. In addition to designing the way a structure looks, civil engineers must understand forces and loads that act upon those structures. Vectors, which have a “starting point, magnitude, and direction”, enable you to define those forces and loads. Any design solutions in architecture and construction should be mathematically justified. Therefore, any civil engineer should know the theoretical foundations of mathematics, be able to build mathematical models, and solve applied problems using the methods of mathematical statistics for processing experimental data.

Module code 4ENT2033
Semester B
15 Credits
Assessment Coursework 50%, Test 50%

4ENT2017 Application of Engineering Materials

The aims of this module are to enable students to develop an understanding of the scientific principles, general properties and appropriate uses of engineering materials for given engineering environments. Please note that this is a 15-credit module, and it requires around 150 hours of student effort. On completion of the module the following learning outcomes will be achieved. Identify the structure of metals, polymers and ceramics, explain relationships with mechanical and physical properties and recognise their use and limitations in engineering environments. Select materials for applications based on the behaviour of the major classes of engineering materials. Select appropriate mechanical testing procedures for the evaluation of engineering materials.

Module code 4ENT2017
Semester B
15 Credits
Assessment Coursework 100%

4ENT2018 Introduction to Manufacturing Technology

This module introduces the student to a range of production processes and practice used commonly in the manufacture of products. Students develop a hands-on appreciation of production techniques including laser cutting,3D printing, fabrication and assembly. Transferable skills (i.e. CNC and CAD) are developed in the application of the processes used to manufacture products and subassemblies taking into account design and supply requirements.

Module code 4ENT2018
Semester B
15 Credits
Assessment Coursework 100%

4ENT1181 Digital Computing Principles (RAI)

This module requires students to learn principles of organization of computing platforms and the practices involved in designing and implementing such platforms. They are then expected to apply their knowledge in a practical context. The module introduces the concept of the computing platform in the organization and function of modern computing systems. The computer hardware is a platform that supports the operating system, application software, and programming environment. Additionally, the module covers the nature of data used by computing platforms, forms that data might take, basic algorithms for representing and processing data, and constraints placed on that data by the choice of platform. This includes an introduction to low-level programming languages and an exploration of memory organization, data movement, and I/O requirements and implementation. These concepts will also set the stage for an examination of more complex topics. The course material is taught using a hands-on approach, providing an understanding and appreciation of fundamental Digital Computing principles.

Module code 4ENT1181
Semester B
15 Credits
Assessment Coursework 0%, Test 100%

4ENT1182 Robot Design and Build Project B

The overall aims of this module are to enable students to complete the electronic and software aspects of a small mobile robot. In this course you will be given the opportunity to put much of what you have learnt is semester A into practice. This will include the development and implementation of the electronic and software components need to operate a small robot. Develop abilities to manage time and resources effectively. Gain awareness and experience of implementing and following health and safety practices and the environmental contexts under which engineers are expected to operate. Develop and practice their ability to communicate using a variety of suitable means.

Module code 4ENT1182
Semester B
15 Credits
Assessment Coursework 100%

4ENT2051 Professional Engineering (RAI) (EE)

This module aims to enable you to take responsibility for your continued professional development and embark on your journey to becoming professional engineers. You will be made aware of the different roles and requirements of engineers in the professional world and the institutions you must engage with to progress in the next stage of your career. You will be explained the importance of relevant codes of conduct and legislation so that you can apply those to your career, starting within your current studies. You will learn how to work effectively in teams embracing differences and adopting communication, leadership, and management strategies to use within your studies and prepare you for your professional career. The module is very engaging as there are a variety of topics containing information that you can apply to becoming a professional engineer. The work in the tutorials are fun and will help you to develop your confidence and enhance your communication skills. The diversity in the range of topics and lectures will help you to understand the role of a professional engineer at a level required to succeed in the module.

Module code 4ENT2051
Semester B
15 Credits
Assessment Coursework 100%

4ENT2053 Programming (RAI) (EE)

Think of a piece of electronic tech. - it's probably running software, which someone had been programming for us. This module will introduce you to basic programming tools and techniques, and we will apply them while introducing you the basics of C language, a powerful, well-established and successful programming language, which is widely applied in all Electronic and Robotic systems. The C language it is widely used by Electronics Engineers. We will be starting from scratch and work through examples as we go towards writing whole 'C' programs including all of the key features of the language. If previous students could give you one bit of advice, it would be: from the start, keep up by spending time programming on your own each week and you will give yourself the best chance of success - when your program works, it's amazing!

Module code 4ENT2053
Semester B
15 Credits
Assessment Coursework 0%, Test 100%

5ENT1011 Automotive Electronics and Control Systems (Auto)

This module will extend your understanding of electronics and applications within automotive vehicles. It will also introduce you to control theory and how to apply it to automotive applications. The content on control theory will include: Laplace transforms, transfer functions and models of dynamic systems, 1st and 2nd order systems and time domain analysis, introduction to control systems and loops, frequency response method to design control systems and estimate their performance and system stability (Bode plots etc). The content on electronics will include among others: automotive sensors and actuators, digital systems, signal conditioning and A2D conversion, automotive data networks.

Module code 5ENT1011
Semester B
15 Credits
Assessment Coursework 100%

5ENT1067 Avionics Systems

In this module, you will explore the avionics on board typical modern jet airliners and other aircraft. 5ENT1067, Avionics Systems is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT1067
Semester B
15 Credits
Assessment Coursework 100%

5ENT1121 Dynamics and Vibrations (Auto and Mech)

The aims of this module are to enable students to gain an understanding of the fundamental principles of dynamics and their application to mechanical systems. Additionally, this module aims to enable students to develop analysis and evaluation skills to evaluate the performance of mechanical systems.

Module code 5ENT1121
Semester B
15 Credits
Assessment Coursework 20%, Test 80%

5ENT1122 Structural Mechanics

In this module, you will gain an understanding of fundamental mechanics concepts and structural behaviour for combinations of types of loading. This module maps to a number of learning outcomes of the Product Design and Development Engineer Standard.

Module code 5ENT1122
Semester B
15 Credits
Assessment Coursework 100%

5ENT1123 Automotive Structures (Auto)

This module aims to extend students' understanding of engineering and scientific principles appropriate to automotive engineering and to lay a sustainable foundation for further studies and career development of students in automotive engineering. It is a 15-credit module and requires around 150 hours of student effort.

Module code 5ENT1123
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

5ENT1124 Introduction and Application of Control Systems (Mech)

In this module, you will explore the basic principles of control systems with an introduction to some of the applications. It is a key second-year module building on your background knowledge and expanding towards Engineering problem-solving. The module will introduce you to developing and understanding mathematical models using MATLAB and Simulink. 5ENT1124, Introduction and Application of Control Systems is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT1124
Semester B
15 Credits
Assessment Coursework 100%

5ENT1132 Control and Autopilot Systems

Automated control is important for both safety as well as to improve the dynamic performance of aerospace systems. In this module you will develop ways to mathematically model the dynamic performance of various aerospace systems and then design controllers to improve their performance. You will be introduced to new mathematical tools as well as the use of Matlab for simulation and analysis of the systems.

Module code 5ENT1132
Semester B
15 Credits
Assessment Coursework 25%, Test 75%, Examination 0%

5ENT1133 Aircraft Dynamics and Vibration

In this module you will learn the fundamental principles of dynamics and their application to aircraft and their systems. This will include kinematics of rigid bodies, dynamics of simple aircraft components and systems and vibrations of aircraft structures. The approach to learning and teaching is based on a combination of lectures (to introduce new concepts and theory) and tutorials (to apply these concepts and theory to solve practical problems in aerospace dynamics), and a laboratory experiment to help develop your understanding of the mechanical concepts such as dynamics of a rigid body, vibration of aerospace structures. Learning is supported by the module team and access to laboratory test rigs. Students will be assessed individually.

Module code 5ENT1133
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

5ENT1134 Aircraft Structural Mechanics

In this module you will extend your understanding fundamental mechanics concepts and structural behaviour for different types of loading resulting in bending, torsion and buckling. You will also gain knowledge about more complex, combined, stress states and learn at how the failure of materials can be predicted. This knowledge of structural mechanics will be linked to applications within the aerospace sector. The approach to learning and teaching is based on a combination of lectures and tutorials, and a series of laboratory experiments to help develop your understanding of the mechanical concepts such as bending, torsion and buckling. Learning is supported by the module team and access to several laboratory test rigs. Students will be assessed individually.

Module code 5ENT1134
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

5ENT1142 Robot Sensors and Signal Processing

The aims of this module are to enable students to develop their knowledge of typical sensors, evaluate them in robotic applications and recommend appropriate sensor technology. Also to design signal processing architectures for processing of the acquired information and estimate signals and systems parameters.

Module code 5ENT1142
Semester B
15 Credits
Assessment Coursework 50%, Test 0%, Examination 50%

5ENT2012 Production and Distribution System Management

In this module, you will explore the principles behind production and distributions systems. Have you ever asked yourself how can be possible to change tyres in a F1 competition in just about 2 seconds or so? This is an example of how you can employ time and motion study to achieve sensational results!

Module code 5ENT2012
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

5ENT2013 Computational Fluid Dynamics

This module addresses the fundamental concepts of Computational Fluid Dynamics and its applications. This module will guide you through a series of lectures and tutorials designed to give students a broad understanding of what computational fluid dynamics is, and how to use it analyse different engineering problems. 5ENT2013 Computational Fluid Dynamics is a 15-credit module and it requires around 150 hours of student effort.

Module code 5ENT2013
Semester B
15 Credits
Assessment Coursework 100%

5ENT2042 Soil Mechanics and Concept Foundation

Geotechnical Engineering is important to all projects that interact with the ground and a good understanding can help develop a civil engineer to face many design and/or site problems. The principles upon this form of engineering are contained with a good understanding of Soil Mechanics. Within the module you will be provided with a foundation understanding of these principles for a well-rounded civil engineer in industry as well as the basics for any more detailed or specialist routes. This module aims to provide an introduction to the soil mechanics theory and practical application required for minor and major civil engineering projects. It will cover a variety of laboratory tests as well as applications of results.

Module code 5ENT2042
Semester B
15 Credits
Assessment Coursework 50%, Test 0%, Examination 50%

5ENT2043 Construction Management

This module will be a journey for the comprehensive exploration of the intricacies involved in managing and delivering civil engineering projects. Throughout this module, we will delve into the techniques, systems, and approaches essential for administering contracts effectively and managing works in the dynamic field of construction and building management. Building on prior knowledge, the module emphasizes the application of risk assessments in planning work, producing health, safety, and quality documents, and ensuring the safe execution of tasks. Special attention will be given to task management, progress monitoring, and a comprehensive understanding of cost base principles.

Module code 5ENT2043
Semester B
15 Credits
Assessment Coursework 40%, Test 10%, Examination 50%

5ENT2044 Surveying and Highway Engineering

This module expands on the principles covered within the level 4 Surveying module and introduces the theory, processes and techniques for survey control of large projects along with the methods and techniques used to design and set out high speed highway alignments. As we have already seen all civil engineering projects need accurate positioning and dimensional control. At level 4 this concentrated on smaller schemes whereas in reality construction projects cover larger areas and require greater accuracy. This can be viewed using traditional methods such as total stations but also using modern technology such as GNSS, robotic total stations, UAV's and laser scanners. Some of the largest civil engineering schemes are within the highways sector and this module will look at highway geometry. Any highway alignment has to be safe but also needs to fit within the confines of the agreed site. Therefore the design of highway geometry is critically important to both of these factors. The module is taught as a series of lectures, tutorials and practical sessions throughout the semester and culminates with a week long residential field course (planned to be at the Constructionarium site in Norfolk), which is linked to one of the assignments.

Module code 5ENT2044
Semester B
15 Credits
Assessment Coursework 100%

5ENT2045 Structural Mechanics (Civil)

In this module, we will explore a key part of structural engineering: structural design - structural design of steel and reinforced concrete members. The first part of the module includes an overview of principles of design, including structural design philosophies, and what and how actions are safely accoount into the design on structures. After that, the module will focus on design of steel elements (tension members, columns, beams, beam-columns, serviceability, connections and detailing) and design of reinforced concrete elements (singly-reinforced beams, one-way slabs, doubly-reinforced beams, T-beams, flat slabs, columns, serviceability and detailing). A brief overview of timber design will be given due to recent interest by consultancies, clients and professional institutions on this. 5ENT2045 Civil Engineering Structural Design is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT2045
Semester B
15 Credits
Assessment Coursework 100%

5ENT2045 Civil Engineering Structural Design

In this module, we will explore a key part of structural engineering: structural design - structural design of steel and reinforced concrete members. The first part of the module includes an overview of principles of design, including structural design philosophies, and what and how actions are safely accoount into the design on structures. After that, the module will focus on design of steel elements (tension members, columns, beams, beam-columns, serviceability, connections and detailing) and design of reinforced concrete elements (singly-reinforced beams, one-way slabs, doubly-reinforced beams, T-beams, flat slabs, columns, serviceability and detailing). A brief overview of timber design will be given due to recent interest by consultancies, clients and professional institutions on this. 5ENT2045 Civil Engineering Structural Design is a 15-credit module, and it requires around 150 hours of student effort.

Module code 5ENT2045
Semester B
15 Credits
Assessment Coursework 100%

5ENT2052 Mechatronics (RAI)

The aims of this module are to enable students to develop their understanding of the multidisciplinary aspects of mechatronics by covering all the main interfaces such as mechanics/dynamics, electrical and electronics as well as control systems.

Module code 5ENT2052
Semester B
15 Credits
Assessment Coursework 50%, Test 0%, Examination 50%

5ENT2054 Aircraft Technical, Air Law and Operational Procedures

This module aims to enable students to become familiar with the air law and aircraft operational procedures for VFR (Visual Flight Rules) and IFR (Instrument Flight Rules) flight, and the Air Traffic Services available for VFR and IFR pilots. Additionally, this module aims to enable students to acquire skills necessary to pursue careers as aviation pilots or flight test engineers and develop an understanding of the technical components of a fixed wing light aircraft.

Module code 5ENT2054
Semester B
15 Credits
Assessment Coursework 50%, Test 50%

5ENT2056 Automotive Electronic Practice

The aims of this module are to enable students to explore the practical aspects of electrical and electronic product design, including schematic layout, PCB design, and circuit board manufacturing. Additionally, this module aims to enable students to be able to use common electronic laboratory instrumentation for the manufacture and testing as well as develop an understanding of electronic systems associated with automotive vehicles.

Module code 5ENT2056
Semester B
15 Credits
Assessment Coursework 70%, Test 30%

5ENT2057 Electronics Practice for Robot Applications (RAI)

The aims of this module are to enable students to be introduced to the practical aspects of electrical and electronic product manufacture, test and design, and of the importance of documentation, both paper and electronic, in these activities. Be able to design and produce schematic and PCB designs which can be manufactured into a printed circuit board. Be able to use electronic laboratory instrumentation. Develop an understanding of electronic systems associated with robotics.

Module code 5ENT2057
Semester B
15 Credits
Assessment Coursework 100%

6ELE0062 Advanced Power Conversion and Control

Power electronics technology deals with the conversion and control of electric power using high-efficiency switching mode power semiconductor devices for a wide range of applications including variable-speed motor drives which are making a significant contribution in industry. This module aims to introduce students to the fundamental concepts and application of power conversion, switch mode power supplies and their control.

Module code 6ELE0062
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ELE0067 Intelligent Systems and Robotics

How can neural, fuzzy and neuro-fuzzy techniques be used to solve control problems, specifically those that arise in behaviour-based robotics? This module is designed to introduce the fundamentals of artificial intelligence and address the practical challenges of effective system design when implementing artificial intelligence algorithms to control the behaviours of robots. This module will expose you to a variety of neural network architectures and will guide you to match a particular architecture and training algorithm to a given robotic problem. You will also study the underlying principles and practical implementation of fuzzy control systems, and will be able to design, simulate and evaluate a fuzzy control system for a specific robot task.

Module code 6ELE0067
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ELE0074 Telecommunication Systems

In this module, you will further develop your knowledge of modern telecommunications systems. The emphasis is on digital aspects of communications, with the study of typical digital and multi-user modulation strategies. Also covered in the module is the study of the effect of channel properties and of channel equalisation techniques. Treatment of the material is analytical, supported by the practical study of typical systems.

Module code 6ELE0074
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1054 High Performance Engine Design (VMS)

Throughout this module you will be introduced to appropriate design techniques suitable for the design of a high performance engine; with this, you'll develop a strong foundation of technical knowledge on which you will build through your respective programmes. High Performance Engine Design is a 15-credit module, and it requires around 150 hours of student effort.

Module code 6ENT1054
Semester B
15 Credits
Assessment Coursework 20%, Test 80%, Examination 0%

6ENT1066 Vibration, Noise and Vehicle Dynamics

The aims of this module are to enable students to: gain understanding the vibration and dynamic response of complex mechanical engineering systems and structures; to enable understanding of the nature of noise and achieve the ability to measure, specify and analyse noise spectra; to assess the effects of dynamic excitation on the responses of a vehicle and to enable understanding of the dynamic characteristics of vehicle motion and vibration

Module code 6ENT1066
Semester B
15 Credits
Assessment Coursework 20%, Test 20%, Examination 60%

6ENT1072 Geotechnical Design

Geotechnical Engineering is important to all projects that interact with the ground and a good understanding can help develop a civil engineer to face many design problems. The principles upon this form of engineering are contained with a good understanding of Soil Mechanics. Within the module you will be developing on the soil mechanics learnt in level 5 to be able to apply it to practical design problems and develop solutions. This module aims to cover foundation and retaining wall design as well a geotechnical solutions, the standards for compliance and regulations to which design must comply.

Module code 6ENT1072
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1075 Sustainable Engineering

The module will involve the following topics arranged under 4 themes: Building Performance –building physics including thermal properties of materials, transport of air, energy and moisture, ventilation of buildings, and introduction to whole building energy modelling and energy performance gap. Impact and assessment methods – environmental impact assessment, life cycle assessment and carbon footprint. Sustainable materials and resource efficiency – Low-impact materials, responsible sourcing (BES 6001), material alternatives, supply chains and sustainability, recycling and re-use, reducing waste and introduction to SmartWaste and Site Waste Management Plans, and sustainable site management. Case studies – a selection of practical examples from industry to illustrate the application of topics taught in the module. You will learn about sustainability and energy in engineering designs, common tools and techniques for analysing and assessing sustainability and underpinning principles of physics of buildings. By the end of the module, you should be able to deploy a selection of tools and techniques to assess sustainability and propose improvements to designs to better manage energy, carbon and the environment.

Module code 6ENT1075
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT1113 Racing Car Body Engineering

In this module you will explore; vehicle structures, manufacturing and assembly, aerodynamics, safety under impact, torsional stiffness and FEA applied to a chassis structure. The module is supported with a number of laboratories and tutorials including; race-car anatomy, CG laboratory and FEA software tutorials. 6ENT1113 Racing Car Body engineering is a 15-credit module and it requires around 150 hours of student effort.

Module code 6ENT1113
Semester B
15 Credits
Assessment Coursework 100%

6ENT1159 Acoustics

The aims of this module are to enable students to develop their understanding of human sound perception. Additionally, this module aims to enable students to develop a systematic understanding of how sound behaves in free-field and enclosed spaces, how it is measured and the ways we can investigate and control noise problems. Finally, this module aims to enable students to use legislation, statutory regulations, standards and codes of practice relating to the assessment and control of noise and vibration.

Module code 6ENT1159
Semester B
15 Credits
Assessment Coursework 20%, Test 20%, Examination 60%

6ENT1160 Renewable Energy and the Environment

The aims of this module are to enable students to develop an understanding of different methods of harnessing energy to generate electrical power. Students will be taken on a guided investigation into the different types of renewable energies, what is currently being used in industry, ground breaking research and critically evaluate for applications in different environments. Environmental studies will be used to show how the environment is changing an to advise on solutions to reduce this change.

Module code 6ENT1160
Semester B
15 Credits
Assessment Coursework 40%, Test 60%

6ENT1161 Automotive Powertrain Technology (Auto)

This module aims are to enable students to be able to apply their knowledge to make recommendations about the best method of energy conversion for a given environment. Additionally, this module aims to enable students to develop an understanding of different methods for propulsion. Students will be able to critically evaluate the integration of different alternative powertrain options and be able to select appropriate solutions within the context of realistic constraints on performance, efficiency, and drivability. Throughout this module you will be introduced to automotive powertrain technology with a focus on electrification. You'll develop a strong foundation of technical knowledge on which you will build through your respective programmes.

Module code 6ENT1161
Semester B
15 Credits
Assessment Coursework 20%, Test 80%, Examination 0%

6ENT1179 Industrial Robotics (RAI)

The aims of this module are to enable students to: Develop a deeper understanding of kinematics, dynamics, and programming of robotic mechanisms. Design industrial robotic systems, considering their functionalities, control, operation, maintenance, and process monitoring. Develop the ability to manage time and resources effectively.

Module code 6ENT1179
Semester B
15 Credits
Assessment Coursework 50%, Test 0%, Examination 50%

6ENT1180 Robot Communication (RAI)

The module is designed to introduce you to the fundamentals of typical wireless and remote communication technologies for the purpose of robotic applications. Concepts, principles, key technologies and their advantages and limitations for different robotic applications will be presented. Theoretical study is supported by practical exercises and lab experiments.

Module code 6ENT1180
Semester B
15 Credits
Assessment Coursework 50%, Test 0%, Examination 50%

6ENT1181 Mobile Robots and Drones (RAI)

The aims of this module are to enable students to develop a deeper understanding, analyse and apply fundamentals of robot navigation. Gain understanding of robot navigation, control and teleoperation with applications in ground and aerial robots.

Module code 6ENT1181
Semester B
15 Credits
Assessment Coursework 50%, Test 50%

6ENT2001 Autonomous Automotive Transportation

Throughout this module you will be introduced to the fundamentals of Autonomous Transportation giving you a insight into the key areas of technology involved in these vehicles. The module will culminate with developing a scale autonomous vehicle, giving the opportunity for you to put the lessons taught into practice. 6ENT2000 Autonomous Aerospace Transportation and 6ENT2001 Autonomous Automotive Transportation are 15-credit modules, and require around 150 hours of student effort.

Module code 6ENT2001
Semester B
15 Credits
Assessment Coursework 40%, Test 0%, Examination 60%

6ENT2057 Integrated Aerospace Systems

This module concentrates on the management and interaction of aircraft systems in order to provide safe and efficient operation. You will study the principles of systems engineering, human factors and how information is communicated between various aircraft systems and the pilot. It also contains a major section on reliability, which is so important to ensuring effective operation in a fleet. You will also use various case studies to appreciate the importance of systems integration

Module code 6ENT2057
Semester B
15 Credits
Assessment Coursework 40%, Test 60%

6ENT1133 Aerospace Vehicle Design

Group Aircraft Design is an opportunity to demonstrate your ability to synthesise what you've learned over the past few years with your own focused research in your specialist roles. As this module is based around a student-led activity, to design a concept aircraft. Module Aims: develop an in-depth understanding of the theory and practices associated with the design of aircraft; experience the process of producing preliminary designs for a whole aircraft through group activity; develop a professional attitude and critical approach to the application of engineering knowledge and skills.

Module code 6ENT1133
Semester B
15 Credits
Assessment Coursework 100%

6ENT1112 Automotive Body Engineering

In this module you will explore; vehicle structures, manufacturing and assembly, aerodynamics, safety under impact, torsional stiffness and FEA applied to a chassis structure. The module is supported with a number of laboratories and tutorials including; race-car anatomy, CG laboratory and FEA software tutorials. 6ENT1113 Racing Car Body engineering is a 15-credit module and it requires around 150 hours of student effort.

Module code 6ENT1112
Semester B
15 Credits
Assessment Coursework 100%