

COMMON ENGINEERING PROGRAMME

Interested in the world of Engineering but unsure about what course to go for? With the Common Engineering Programme (CEP), you will have more time to explore the many fields of engineering instead of deciding on a specific discipline straight away.

During the first semester, you'll go on our unique Induction Programme to gain real-world experience through industry visits and dialogues, and receive career guidance to help you make a more informed decision in your course selection. You will also build a broad-based foundation in mechanical, electronic and electrical engineering, as well as mathematics and programming.

Apply the knowledge that you've learnt by working on an integrated real-world project. You'll get to choose either the Electrical & Electronic Track or Mechanical Track after your first semester, and choose a specific engineering diploma* to major in by the end of your first year. Upon graduation, you will receive the same diploma as your peers who have enrolled for a particular course right from the start.

YEAR 1 COURSE MODULES

LEVEL 1.1

Electrical Engineering Fundamentals

This module provides a foundation in electricity covering basic concepts of electrical circuits and the methods used to analyse them. The module emphasises the understanding of the basic electrical circuit laws (Ohm's Law, Kirchhoff's Voltage and Current Laws) and network theorems, and their application to electrical network analysis. Topics covered include fundamentals of electricity, network theorems, capacitance, electromagnetic induction and inductance.

Engineering Mathematics 1

This module is designed to provide students with the fundamental skills in mathematics required to solve basic engineering problems. Topics are introduced in an order that is intended to keep abreast of the application requirements in engineering modules. The emphasis in each topic is on simple applications and problem solving. Topics include algebra, trigonometry, logarithms, plane analytic geometry, matrices and complex numbers. Throughout the module, there is appropriate use of a Computer Algebra System.

Integrated Real-world Project 1

This module aims to integrate the knowledge learnt in the semester and apply to a real-world project and further enhanced through relevant contextualisation. Students will work in teams and undertake the project development underpinned by the design thinking approach. On completion of the module, students will be able to apply the skills and develop confidence in tackling projects. Data analytics will be introduced using case-based approach and applied in the integrated real-world project.

The Career & Professional Preparation 1 will be incorporated to give students a foundational introduction to their three-year diploma course curriculum and how it prepares them for industry. It will help them to embark on their course with the end in mind, through guided reflection of their personal characteristics, and producing an overall game plan for their future education and career goals.

Mechanical Engineering Fundamentals

This module introduces students to the study of external forces in two dimensions and their effect on particles and rigid bodies that are at rest. Students learn the skills to analyse the forces acting on the bodies by drawing free-body diagrams and applying the conditions of equilibrium. Topics include forces and resultants, moments and couples, equilibrium and the concepts of plane friction. This module also aims to equip students with the skills to analyse problems of rigid bodies in motion. Only linear motion in two dimensions will be covered. Topics include kinematics and kinetics of linear motion.

Programming

This practice-oriented module equips students with basic knowledge and skills in computer programming using C language. The main topics include basic computer programming concepts, fundamentals of C programming including branching, loops, and functions.

LEVEL 1.2

MECH (MECHANICAL) TRACK

Electrical & Electronic Technology

The aim of this module is to introduce the fundamental concepts of digital electronic devices and circuits. It intends to deepen the electrical fundamentals learnt in the first semester. Topics include AC circuit theory and transformer fundamentals, number systems, Boolean algebra, combinational logic design, applications of latches, flip-flops, counters and registers.

Engineering Mathematics 2

This module is designed to provide students with the fundamental skills in mathematics required to solve basic engineering problems. Topics are introduced in an order that is intended to keep abreast of the application requirements in engineering modules. The emphasis in each topic is on simple applications and problem solving. Throughout the module, there is appropriate use of a Computer Algebra System. Topics include trigonometry, differentiation and simple integration with applications.

Integrated Real-world Project 2

This module aims to integrate the knowledge learnt in the semester and apply to a real-world project and understand the relevance and application of the modules learnt. Students will work in teams and undertake the project development underpinned by the design thinking approach. On completion of the module, students will be able to apply the skills and develop confidence in tackling projects at the higher levels. This module will also imbue in students a sense of civic consciousness in the context of engineering and society. It serves to create awareness amongst students about the impact of engineering on society in general. In the process it introduces the application of cultural quotient (CQ) skills and mould students' disposition to understand and collaborate across diverse cultures in real world settings.

Materials & Manufacturing Technology

This module introduces students to properties of common engineering materials with emphasis on mechanical testing methods, heat-treatment, international standard specifications, and selection and applications of such materials. Topics include classification of materials, mechanical testing, alloying, steels, non-ferrous alloys, plastics, ceramics and composites. For manufacturing technology, students will acquire the basic knowledge and skills of manufacturing processes, including drilling, turning, milling, grinding, non-conventional machining, welding and assembly.

Thermofluids

Students will learn the basic laws governing the behaviour of fluids under the influence of energy transfer. Topics include systems concept, temperature and pressure, fluid statics, fluid in motion, continuity equation, laminar and turbulent flows, ideal incompressible flow, Bernoulli's equation, flow measurement and Pitot tube, external flow and application of thermofluid's principles in simple engineering systems.

ELECT (ELECTRICAL & ELECTRONIC) TRACK

AC Circuits

The aim of the module is to provide first year students with a basic knowledge of the fundamental principles in electric circuit analysis. The module first explores DC network theorems such as Kirchhoff's Laws, Thevenin's Theorem and Principle of Superposition. Application of the theorems are then extended to AC circuits which involve impedances such as capacitance and inductance. The module also includes analysis of simple AC series, parallel and series-parallel combination circuits, concept of AC power and understanding of power factor and its effect on electrical energy usage.

Analogue Electronics

The aim of this module is to lay the foundations in analogue electronics. At the end of this module, students will acquire content knowledge and understanding on the basic concepts of analogue electronics and some applications. Key topics covered in this module include operating characteristics, working principles and applications of discrete electronic devices such as various types of diodes, MOSFETs and BJTs. Practical circuits will be used to enhance and strengthen the learners' knowledge so that they will acquire the relevant competencies to move on to more specialised modules.

Digital Fundamentals

This module introduces the basic principles of digital systems. It covers combinational and sequential logics circuits, multiplexers/demultiplexers and decoders. Flip-flops and their application in counters and registers will also be discussed. This basic knowledge is essential for students to be able to analyse, troubleshoot and design basic digital circuit system.

Engineering Mathematics 2

This module is designed to provide students with the fundamental skills in mathematics required to solve basic engineering problems. Topics are introduced in an order that is intended to keep abreast of the application requirements in engineering modules. The emphasis in each topic is on simple applications and problem solving. Throughout the module, there is appropriate use of a Computer Algebra System. Topics include trigonometry, differentiation and simple integration with applications.

Applied Mathematics 2B

This module aims to provide students with the fundamental skills in applying mathematics to solve engineering problems. The emphasis of the teaching and learning is on applications and problem solving. Topics include additional techniques of differentiation and their applications, basic & further techniques of integration and their applications, ordinary differential equations, Laplace transform and applications, vectors and linear equations, matrices and applications. Materials on MOOC platform could be adapted in the module delivery.

Integrated Real-world Project 2

This module aims to integrate the knowledge learnt in the semester and apply to a real-world project and understand the relevance and application of the modules learnt. Students will work in teams and undertake the project development underpinned by the design thinking approach. On completion of the module, students will be able to apply the skills and develop confidence in tackling projects at the higher levels. This module will also imbue in students a sense of civic consciousness in the context of engineering and society. It serves to create awareness amongst students about the impact of engineering on society in general. In the process it introduces the application of cultural quotient (CQ) skills and mould students' disposition to understand and collaborate across diverse cultures in real world settings.

YEAR 1 COURSE CURRICULUM

Module Name	Credit Units
Level 1.1 (20 hours per week)	
Electrical Engineering Fundamentals	3
Engineering Mathematics 1	4
English Language Express*	NA
Innovation Made Possible^	3
Integrated Real-world Project 1	4
Mechanical Engineering Fundamentals	3
Programming	3
Level 1.2 (21 hours per week)	
MECH (Mechanical) Track	
Communication Essentials^	3
Electrical & Electronics Technology	3
Engineering Mathematics 2	4
Health & Wellness^	1
Integrated Real-world Project 2	4
Materials & Manufacturing Technology	3
Thermofluids	3
Level 1.2 (21 hours per week)	
ELECT (Electrical & Electronics) Track	
AC Circuits	3
Analogue Electronics	3
Communication Essentials^	3
Digital Fundamentals	3
Engineering Mathematics 2	4
Applied Mathematics 2B ⁺	5
Health & Wellness^	1
Integrated Real-world Project 2	4

Notes:

^ For more details on Interdisciplinary Studies (IS) electives, please log on to www.np.edu.sg/is

* This module is only offered to students who are weaker in the English Language.

+ Students who wish to be considered for joining the Engineering Science course after 2nd semester will be required to take the module Applied Mathematics 2B instead of Engineering Mathematics 2 in the 2nd semester under the Electrical & Electronic Sub Track.

IS Modules

The School of Interdisciplinary Studies (IS) delivers a broad-based curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge economy. IS offers both prescribed modules and electives to challenge boundaries. Prescribed modules develop students' competencies in core areas such as Communication, Innovation and Enterprise, Culture and Communication, and Personal Mastery and Development, while elective modules provide insights into Arts and Humanities, Business, Design, and Science and Technology.