

ELECTRICAL ENGINEERING COURSE MODULES

As a highly versatile course, the Diploma in Electrical Engineering [EE] provides broad-based training in the areas of electricity & power systems, energy management and smart systems and specialised training in either the clean energy or power engineering domain.

In your first year, you will learn the fundamentals of electrical engineering with modules such as Electrical Engineering Fundamentals and AC Circuits as well as Programming and Analogue Electronics. In your second year, you will deepen your engineering knowledge and skills with modules such as PLC & Automation, Microcontroller & System, Electrical Installation Design and Energy Management Systems. In your final year, you will choose your specialisation in either Clean Energy Management or Power Engineering and put your knowledge and skills to practice in your six-month internship or final-year project.

The Clean Energy Management specialisation prepares graduates for the sustainable energy sector with a strong focus on energy management and clean energy technologies while the power engineering specialisation prepares graduates for exciting careers in diverse sectors such as the power & energy, land transport and marine & offshore as well as offers them a head start to practice licensed electrical work.

LEVEL 1.1 Common Curriculum for CEP and Non-CEP Pathways

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.

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.

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.

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.

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 contextualization. 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.

Innovation Made Possible (IS Module)

This module aims to help students discover and hone their innate ability to think creatively and come up with innovations to tackle problems close to their hearts. Underpinned by the Design Thinking framework, students will be sensitized to the process of user-centric problem solving. They will be introduced to concepts such as empathy, problem-definition, ideation, prototyping and testing through a practical approach featuring engaging out-ofclassroom activities, just-in-time master-classes and a hands-on, "learning by doing" delivery format. Ultimately, the module will help students recognize that innovation is attainable and fun and develop creative confidence to explore new ideas in their studies and beyond.

LEVEL 1.2 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 specialized 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.

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.

Sports and Wellness (IS Module)

This module helps you to learn a sport as a recreational activity to keep you fit and healthy. Team-building and collaboration skills are developed as you network with other students. There is a total of 19 sports electives to choose from: Aerobics, Badminton, Basketball, Cheerleading, Dance Movement, Dancesport, Flag Football, Hip Hop, Life Saving/Swimming, Netball, Orienteering, Street Soccer, Soccer, Softball, Tennis, Touch Rugby, Volleyball, Wellness Programme and Yoga. Outstanding students are awarded a Pass with Merit.

Communication Essentials (IS Module)

This module aims to develop written and spoken communicative competence in students by exposing them to a range of contemporary issues. Through researching on and discussing different topics from different disciplinary perspectives, students acquire lexis and syntax through critical reading and writing while developing awareness of self in society. The integration of critical thinking and analysis will enable students to articulate their thoughts and perspectives through oral presentations and written texts. The module will also develop an awareness of cultural intelligence with global viewpoints.

COURSE CURRICULUM

Module Name	Credit Units
YEAR 1	
Level 1.1 (20 hours per week)	
Engineering Mathematics 1	4
Mechanical Engineering Fundamentals	3
Electrical Engineering Fundamentals	3
Programming	3
Integrated Real-world Project 1	4
Innovation Made Possible ^	3
Level 1.2 (22 hours per week)	
Engineering Mathematics 2	4
AC Circuits	3
Analogue Electronics	3
Digital Fundamentals	3
Integrated Real-world Project 2	4
Communication Essentials ^	3
Sports & Wellness ^	2

Notes:

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

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.