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 3.1

CLEAN ENERGY MANAGEMENT SPECIALISATION OPTION

Energy Studies & Audit

This module introduces students to the energy audit process and measurement techniques. Students learn to use energy measuring equipment and building modelling and simulation software tools to conduct an energy audit. Utility data analysis, building information management (BIM), energy performance profiling, building energy modelling and simulation, development of benchmarking system, environment management standards ISO 14000, and financial analysis for predicted savings will be covered.

Clean Energy Technologies

This module provides a hands-on experiential approach for students explore and learn about the fundamental characteristics of clean energy technologies such wind, solar and fuel cell systems. Topics include the principles of operation and energy conversion processes of solar, chemical and wind power sources with special emphasis on PV systems.

Design & Operation of Distributed Power Systems

This module takes students through the design process of photovoltaic (PV) system and operation, identifying appropriate PV applications in power systems and undertaking simple PV system design. It also introduces the concept of distributed power generation and distribution of electricity and the challenges faced. Students will learn about power flow and fault studies pertaining to distributed power generation and network protection required due to the integration of photovoltaic and wind-turbine grid connected systems into the power grid.

Integrated Real-world Project 5

Integrated Real-world Project 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. Upon completion of the module, students will be able to apply the skills and develop confidence in tackling projects.

Project ID: Connecting the Dots (IS Module)

This module aims to prepare students for an increasingly globalised and interconnected world where problems are multi-faceted and require interdisciplinary research and collaboration to solve. Using a project-based learning approach, students will have the opportunity to work in a multi-disciplinary team to investigate and propose comprehensive recommendations for a pressing real-world problem affecting Singapore. They will be guided to step out of their disciplinary silos and effectively communicate and collaborate with peers from different backgrounds. Ultimately, the module seeks to develop independent learning skills and the ability to synthesise diverse strands of knowledge to solve a complex problem, while impressing on students the importance of being a responsible global citizen.

POWER ENGINEERING SPECIALISATION OPTION

System Modelling & Control

The module focuses on modelling the dynamics and servo systems, analysis of system responses and shaping the dynamic response through closed-loop control. Students will learn the principles of systems modelling, simulation, analysis and control, and the application of these principles in systems analysis and synthesis. Major topics include modelling single discipline and mixed systems, Laplace transform, s-plane, standard forms, time-domain specifications, effects of control actions on system performance, and frequency response analysis.

Smart Electricity System

This module introduces students to smart grid technologies which are transforming the electricity landscape to a de-centralised, sustainable and more consumer-interactive model. In this module, the basic concepts of distributed generation, demand management and energy storage will be explored.

Power Systems Design & Operation

This module covers the technical skills and knowledge to perform basic design, installation, testing, operation and maintenance of electrical power systems including grid, PV and rail power systems. The module also introduces the sound engineering practices and the relevant regulations and code of practices explored.

Integrated Real-world Project 5

Integrated Real-world Project 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. Upon completion of the module, students will be able to apply the skills and develop confidence in tackling projects.

Project ID: Connecting the Dots (IS Module)

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LEVEL 3.2

6-Month Local/Overseas Internship

Students have the opportunity to apply the skills and knowledge acquired in the classroom in a real-life environment via on-the-job training. This programme allows students to hone skills in the areas of problem-solving, interpersonal

communications, project planning and implementation, industrial liaisons and character building. Participating companies will have the opportunity to assess prospective employees and secure the services of these students in advance.

OR

Project Design & Development

Students will work full-time on a group project and have the flexibility to choose from a wide range of topics related to system design and integration, research and development, computer applications or other engineering areas. Students are required to carry out research, design, implementation, testing and troubleshooting processes from a prototype to a final product or system under supervision. Students will also learn to apply project management and scheduling skills to enable them to complete their project in time. They will be required to document their project development process and present their projects at regular intervals.

COURSE CURRICULUM

Module Name	Credit Units
YEAR 3	
Level 3.1 (20 hours per week)	
Common Module	
Project ID: Connecting the Dots ^	4
CLEAN ENERGY MANAGEMENT OPTION	
Energy Studies & Audit	4
Clean Energy Technologies	4
Design & Operation of Distributed Power Systems	4
Integrated Real-world Project 5	4
POWER ENGINEERING OPTION	
System Modelling & Control	4
Smart Electricity System	4
Power Systems Design & Operation	4
Integrated Real-world Project 5	4
Level 3.2	
6-Month Local/Overseas Internship	20
or	
Project Design & Development	20

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.