

## COURSE CURRICULUM

Module Name	Credit Units
<b>YEAR 1</b>	
<b>Level 1.1 (24.5 hours per week)</b>	
Career & Professional Preparation I	1.5
Computer-Aided Drawing	2
Computer Programming	4
Engineering Mathematics 1	5
Engineering Mechanics	4
Electrical Technology	4
Innovation Toolkit 1 ^	2
Sports & Wellness ^	2
<b>Level 1.2 (27 hours per week)</b>	
AC Circuits	5
Analogue Electronics & Applications	5
Digital Electronics & Practice	2
Electrical & Electronic Practical Skills	4
Engineering Mathematics 2	5
Communication & Contemporary Issues^	4
Innovation Toolkit 2 ^	2

### Notes:

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

The Minor in Business Management has the same Year 1 curriculum.

## COURSE MODULES

### LEVEL 1.1

#### Computer Programming

This practice-oriented module equips students with the basic knowledge and skills in computer programming using C language. The main topics include basic computing concepts, fundamentals of C, branching, loops, and C functions. On completion of the module, students will be able to explain and write C programmes for simple engineering applications.

### **Electrical Technology**

This module introduces the necessary foundation for electrical circuit analysis covering electrical theorems and techniques for analysing and solving direct and alternating current circuit problems. Laboratory assignments include basic electrical measurement skills and concepts learnt in lectures and tutorials.

### **Computer-Aided Drawing**

This workshop-based module introduces the basic concepts of engineering drawing such as the construction of basic lines and shapes, dimensioning, editing and drawing manipulation. Commonly used engineering drawing layouts are included.

### **Engineering Mathematics 1**

This module provides students with mathematical skills for solving basic engineering problems. Topics are organised to keep pace with applications in the engineering modules. They include algebra, trigonometry, logarithms, matrices and complex numbers. A Computer Algebra System will be used where appropriate.

### **Engineering Mechanics**

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 and rotational motion in two dimensions will be covered. Topics include Kinematics of linear and rotational motion, and Kinetics of linear and rotational motion.

### **Career & Professional Preparation I**

This module helps 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 three-year 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. The module aims to deepen students' commitment to the sector that the course prepares them for.

## **LEVEL 1.2**

### **AC Circuits**

Students will learn the basic principles of electrostatics, capacitance, electromagnetic inductance and the transient behaviours of R-C and R-L circuits. This module also covers basic principles of alternating current voltage generation, the characteristics of an A.C. sine wave and its mathematical representation, and the basic theory of alternating current applied to R, L and C series, parallel and series-parallel circuits. Concepts on AC power, power triangle and power factor will also be discussed.

### **Analogue Electronics & Applications**

This module expounds on the fundamental concepts of analogue electronic devices and circuits. It covers semiconductor physics as well as the device characteristics, operating principles and common applications of diodes and transistors. The module will equip students with a thorough understanding of DC biasing and AC operation of transistor amplifier circuits. This will be achieved through worked examples, tutorials, laboratory sessions and e-learning materials.

### **Digital Electronics & Practice**

This module covers basic principles of digital electronics. Topics include Number Systems and Codes, Logic Gates and Boolean Algebra, Combinational Logic Circuits, Counters, Flip-flops and Data Handling Circuits. Students will be able to explain and analyse the workings of digital circuits through hands-on experiments in the laboratory.

### Electrical & Electronic Practical Skills

This module equips students with hands-on practical skills in basic electrical wiring and installation, industrial control using relays, sensors and programmable logic controllers. They learn to assemble, solder and test electronic circuits on breadboard, strip-board, and printed circuit board, and use test and measurement equipment such as the oscilloscope, function generator and digital multi-meter.

### Engineering Mathematics 2

This module equips students with further mathematical skills to solve engineering problems. Topics include further trigonometry, trigonometric graphs, plane analytic geometry, differentiation with applications, and integration with applications.

### COURSE CURRICULUM

Module Name	Credit Units
<b>YEAR 2</b>	
<b>Level 2.1 (23 hours per week)</b>	
Career & Professional Preparation II	2
Electrical Circuit Analysis & Measurement	6
Electrical Machines & Drives	6
Microcontroller & Applications	3
PLC & Applications	3
Sensors & Instrumentation	3
<b>Level 2.2 (25 hours per week)</b>	
Advanced PLC & Networking	2
Digital Systems & Applications	3
Electronic Devices & Circuits	6
Engineering Mathematics 3A	4
PC Networking	3
Power Electronics & Applications	5
Interdisciplinary Studies (IS) elective ^	2

### MINOR IN BUSINESS MANAGEMENT#

Module Name	Credit Units
<b>YEAR 2</b>	
<b>Level 2.1 (26 hours per week)</b>	
Career & Professional Preparation II	2
Electrical Circuit Analysis & Measurement	6
Electrical Machines & Drives	6
Marketing Fundamentals	4
PLC & Applications	3
Sensors & Instrumentation	3
Business & the Economy ^	2
<b>Level 2.2 (26 hours per week)</b>	
Advanced PLC & Networking	2
Electronic Devices & Circuits	6

Engineering Mathematics 3A	4
Fundamentals of Financial Management	4
PC Networking	3
Power Electronics & Applications	5
Effective People Management ^	2

**Notes:**

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# The Minor in Business Management has the same Year 1 curriculum.

**COURSE MODULES**

**LEVEL 2.1**

**Career & Professional Preparation II**

This module helps to equip students with skills necessary to seek and secure work. They will also be equipped to communicate their personal brand in a positive way. As students sharpen their communication skills, they will also learn how to market themselves effectively.

**Electric Circuit Analysis & Measurement**

This module covers the concepts, theorems and measurement techniques needed in electrical engineering including three phase system analysis, power measurement and power factor correction, harmonics, transient and steady-state analysis, and measurement procedures and techniques.

**Electrical Machines & Drives**

This module provides students with the basic concepts and working principles of common types of electrical machines and motor drives. They will be introduced to the construction, working principles, performance characteristics of transformers, DC motors, induction motors, synchronous generators and stepper motors, and their applications in the industry. Students will also be introduced to motor drive systems and their applications.

**Marketing Fundamentals**

The module introduces concepts and principles of marketing of goods and services to enable students to better understand and evaluate the marketing system in which products and services are planned, priced, promoted and distributed. Apart from the four Ps in marketing, topics covered also include segmentation, targeting and positioning, product mix, service marketing, channel decisions and branding.

**Microcontroller & Applications**

This practice-oriented module is designed to equip students with an understanding of the conceptual and operational aspects of a microcontroller embedded system. Students will learn about the hardware and software design of a general purpose computer system, the fundamental concepts of microcontrollers and the interfacing with external applications. Intel's 8051 microcontroller series will be used as a reference example. Assembly and C language will be used in project-based exercises. Students will also learn to use microcontrollers for engineering applications.

### **Sensors & Instrumentation**

The module provides students with graphical programming skills using LabVIEW and the knowledge to develop virtual instrumentation systems. Students learn the concept of virtual instrumentation, sensor technologies, data acquisition devices, and computer interfaces such as RS232, GPIB and USB.

### **PLC & Applications**

This module introduces students to electrical control systems, which cover sequential motor control circuits, direct-on-line and star-delta motor starter circuits. Students will then be taught the PLC (programmable logic controller) theory of operation, basic functions, the I/O addressing and interfacing, and the design of ladder logic programmes. Students will design PLC-based systems related to industrial applications through numerous hands-on exercises.

## **LEVEL 2.2**

### **Advanced PLC & Networking**

This is a follow-on module of PLC and Applications.

This module provides more programming functions of PLC such as data movement, conversion and logic instructions as well as the control of the variable speed drive. Students will also be introduced DeviceNet, a network system that interconnects control devices for data exchange. Students will learn about the DeviceNet cable system, configuration of the driver, the scanner module and the network devices through hands-on experiments.

### **Digital Systems & Applications**

This module builds on basic material covered in Level 1 Digital Electronics & Applications with topics such as flip-flops, adders, multiplexers/de-multiplexers, encoders/decoders, shift registers and counters. Students will have plenty of practice-oriented training in the design of digital system with real-life applications. Testing and verification of the digital circuits developed will be done using a hardware description language.

### **Electronic Devices & Circuits**

This module aims to provide students with a general understanding of some commonly used analogue and digital electronic devices. The module covers the operating principles, characteristics and applications of operational amplifiers, digital-to-analogue and analogue-to-digital converters, integrated-circuit logic families and memory devices.

### **Engineering Mathematics 3A**

This module is a continuation of Engineering Mathematics 2. Topics include Integration Techniques & Applications, First Order Differential Equation, Fourier series and Laplace Transform.

### **Fundamentals of Financial Management**

This module covers basic accounting and financial concepts and principles to enable students to understand and interpret financial statements and reports. Students will also have an understanding of costing concepts and the financial techniques used in making financial decisions and evaluating capital investment projects. PC Networking Computer networks are essential to organisations. In this module, students will study PC Networking (PCN) that focuses on data networking knowledge.

The Open System Interconnection (OSI) reference model and Transmission Control Protocol/Internet Protocol (TCP/IP) model will be used to explain important networking concepts. Standards and products associated with each OSI layer and data flow in networking devices will be discussed. Premises structured cabling systems standards, media types and performance criteria, system design and installation recommendations are also covered.

### **Power Electronics & Applications**

This module provides students with a broad-based understanding of power semiconductor devices (e.g. BJT, IGBT, thyristors, MOSFETs) and the use of such devices for the control of electrical power. Rectifiers, inverters, DC-to-DC power converters, variable speed drives for DC and AC motors will be covered in this module.

## COURSE CURRICULUM

Module Name	Credit Units
<b>YEAR 3</b>	
<b>Level 3.1 (23 hours per week)</b>	
<b>Common Modules</b>	
Interdisciplinary Studies (IS) elective ^	2
World Issues: A Singapore Perspective ^	2
<b>ELECTRIC TRANSPORTATION SPECIALISATION</b>	
<b>(24 hours per week)</b>	
Electric Vehicle & Charging Systems	5
Fuel Cell Vehicle	5
Mass Transit & Light Rail Systems	5
Elective Discipline Module (Electrical Installation Design, Engineering Contract & Project Management, or Control & Automation)	5
<b>MARINE &amp; OFFSHORE ELECTRICAL SYSTEMS SPECIALISATION</b>	
<b>(24 hours per week)</b>	
Design of Marine Electrical Systems	5
Electrical Power & Machinery Systems	5
Instrumentation & Auxiliary Systems	5
Elective Discipline Module (Power Electronics, Design & Operation of Photovoltaic Systems, or Control & Automation)	5
<b>AUDIO-VISUAL TECHNOLOGY SPECIALISATION</b>	
<b>(24 hours per week)</b>	
Audio Video System Integration	5
Stage Lighting	5
Video Conferencing & Streaming Technology	5
Elective Discipline Module (Electrical Installation Design, Electronic System Design, or Media Transmission System)	5
<b>ELECTRONICS SPECIALISATION</b>	
<b>(24 hours per week)</b>	
Electronic System Design	5
Embedded System Design	5
Power Electronics	5
Elective Discipline Module (Engineering Contract & Project Management, Electrical Installation Design, or Photovoltaic & Cell Fabrication Technology)	5

**ENGINEERING MANAGEMENT SPECIALISATION****(24 hours per week)**

Electrical Installation Design	5
Engineering Contract & Project Management	5
Power System Economics & Energy Market	5
Elective Discipline Module (Power Distribution & Protection, Design & Operation of Photovoltaic Systems, or E-Commerce Technology & Applications)	5

**ENGINEERING PRODUCT DEVELOPMENT SPECIALISATION****(24 hours per week)**

Embedded Systems & Applications	3
Intelligent Motion Control	3
Applied Analogue Electronics	3
Integrated Project	11

**POWER ENGINEERING SPECIALISATION****(24 hours per week)**

Control & Automation	5
Electrical Installation Design	5
Power Distribution & Protection	5
Elective Discipline Module (Engineering Contract & Project Management, Power System Economics & Energy Market, Power Electronics, or Design & Operation of Photovoltaic Systems)	5

**SOLAR TECHNOLOGY SPECIALISATION****(24 hours per week)**

Building Energy Studies	5
Design & Operation of Photovoltaic Systems	5
Photovoltaic & Cell Fabrication Technology	5
Elective Discipline Module (Electrical Installation Design, Power Distribution & Protection, or Engineering Contract & Project Management)	5

**Level 3.2 (22 hours per week)**

6-Month Local/Overseas Internship or Project Design & Development	22
	22

## MINOR IN BUSINESS MANAGEMENT#

Module Name	Credit Units
<b>YEAR 3</b>	
<b>Level 3.1 (22 hours per week)</b>	
Business Management Elective	4
Engineering Contract & Project Management	5
Elective Discipline Module (Power System Economics & Energy Market, Electrical Installation Design, Design & Operation of Photovoltaic Systems, or E-Commerce Technology & Applications)	5
Starting & Managing an Enterprise	4
Interdisciplinary Studies (IS) elective ^	2
World Issues: A Singapore Perspective ^	2
<b>Level 3.2 (22 hours per week)</b>	
6-Month Local/Overseas Internship or Project Design & Development	22

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## COURSE MODULES

### LEVEL 3.1

#### **ELECTRIC TRANSPORTATION SPECIALISATION**

##### **Electric Vehicle & Charging Systems**

This module covers the working principles of electric vehicle (EV), electric motors and controllers, the charger and electrical system, the battery storage and management system. The vehicle charging processes (different modes of charging) and the safety requirements will be introduced. The infrastructure for the charging stations, the impact of EV charging on the power network and the use of EV as energy storage for the power system will be examined.

##### **Fuel Cell Vehicle**

This module aims to provide the students with an appreciation on the use of fuel cell in various mode of transportation. The working principles of Proton Exchange Membrane (PEM) fuel cell and electronic system for fuel cell vehicle will be introduced. The module covers the application of fuel cell for fuel cell car/bus, fuel cell forklifts and fuel cell powered airplane (unmanned aerial vehicles).

### **Mass Transit & Light Rail Systems**

This module gives a broad overview of the mass transit systems such as MRT (or subway) and electric light rail system for major cities. The topics include the operation of the electric traction motors, the propulsion system, automatic train control system (ATC), regenerative braking, the auxiliary equipment for the train, the power supply and distribution systems. The students will be introduced to the working principles of high-speed train, such as Japanese bullet train (Shinkansen) and Taiwan high-speed train.

## **MARINE & OFFSHORE ELECTRICAL SYSTEMS SPECIALISATION**

### **Electrical Power & Machinery Systems**

This module covers the design and operation of electrical power generation plant and emergency power systems for marine and offshore industries. Topics include the design criteria, construction and selection of generators, excitation methods, automatic voltage regulators, as well as synchronisation of generators for parallel operation and load sharing. The operating principles of low voltage and medium voltage DC and AC machines and drives for marine and offshore applications will also be taught.

### **Design of Marine Electrical Systems**

This module covers the design of electrical distribution network for ships and oil rigs. Students will learn the estimation of load requirements, selection of protective devices, sizing of cables, design of switchboards and bus bar systems. Harmonic filtering, EM disturbances and counter measures, reserve (standby) and alternative power sources, surge protection, batteries systems will be covered in this module.

### **Instrumentation & Auxiliary Systems**

This module covers the fundamentals of instrumentation, method of measurement, process control and their applications in marine and offshore industries. Topics include operating principles of measuring instruments, instrumentation standards, working principles of Supervisory and Data Acquisition (SCADA) system, cathodic protection system, fire and gas detection and alarm systems.

## **AUDIO-VISUAL TECHNOLOGY SPECIALISATION**

### **Audio Video Systems Integration**

In this module, students will study the standards, characteristics and specifications of audio video devices such as DVD players, surround sound speaker systems, MP3/MP4 players, HDTV (LCD/Plasma) and HDMI cables and connectors. Students will learn how to design integrated audio video systems which covers equipment selection, acoustic and sound proofing, speaker selection and placement and also cable selection and wiring. The module will also introduce students to the latest development in the Digital Living Network Alliance (DLNA) software and devices.

### **Stage Lighting**

This module enables students to learn the technical and creative aspects of stage lighting. Topics include basic design, colour and exposure theory, types of lighting instruments, power distribution, control, safety, proper hanging, connection, focus, and control of instruments.

Upon completion of this module, students will be able to perform creative lighting layout, install concert lighting, explain colour theory, integrate lighting control instrumentation, and set up a variety of motion lighting instruments.

### **Video Conferencing & Streaming Technology**

This module provides training in streaming technologies that include local network, internet audio and video streaming technology, web-casting and voice over IP (VoIP). Students will acquire knowledge of hardware configurations, transmitters and receivers, quality of service, routing, re-sequence, signal processing and streaming standards. The module also includes an overview of the MPEG-4 data compression mechanism, and issues related to shooting video for streaming, editing, quality control, and the formatting of streaming audio and video to fit various applications such as video conferencing, web-casting, pod-casting and mobile entertainment systems.

### **Media Transmission System**

This module allows students to learn about media data communication, analogue and digital transmission systems that include AM, FM, cable TV, satellite TV, DAB, and DVB. For data communication, students will gain an understanding of the base-band concept, data encoder and decoder, error detection and correction, routing information, reconstruction and lock synchronisation. For wireless systems, students will study system configurations, transmitters and receivers, error performance, path loss, signal processing, bandwidth, data rate, relative complexity, advantages and disadvantages, and transmission standards.

## **ENGINEERING PRODUCT DEVELOPMENT SPECIALISATION**

### **Integrated Project**

Students will work on a group project that integrates knowledge and skills learnt from the core modules of the Engineering Product Development option. Students are required to carry out research, design, implementation, testing and troubleshooting processes from a prototype to a final product or system under supervision.

### **Applied Analogue Electronics**

This module equips the students with practical skills in analogue signal conditioning, current source and motor drive circuits. Students will learn Power Supply Design principles such as voltage regulator with multiple output voltage requirements, switching noise and battery specifications. Through this module, troubleshooting skills are emphasised to undergird students' foundations in analogue circuits design.

### **Embedded System & Applications**

The module covers the hardware and software design for systems containing the PIC microcontroller series, a reduced instruction set processor (RISC). Students will learn to interface the PIC with 7 segment display, LCD, keypad, stepper and servo motor, rotary encoder, relays, real time clock, UART, SPI and I2C communications, analog to digital converter and digital to analog converter. Towards the end of the semester, students will do a mini project and develop a product such as a low cost handheld electronic game.

### **Intelligent Motion Control**

This module provides students with a comprehensive understanding of the architecture of a motion control system, including motion controllers, drives, actuators and sensors. Students will learn to design and implement closed loop motion control systems to achieve required motion profiles, involving control in speed, position and acceleration. They will learn about coordinated motion control by linking distributed motion controllers using different communication protocols. Customisation of a motion control solution to cater for different applications will also be explored in the context of integrating motion system with other relevant systems, such as vision, speech and HMI.

## **SOLAR TECHNOLOGY SPECIALISATION**

### **Building Energy Studies**

This module will train students in the field of energy studies using building modelling and simulation software which are increasingly being required by the industry when new buildings are designed or existing buildings are being retrofitted. Energy modelling will allow building owners and designers to better understand and predict the energy consumption patterns in their buildings before they are built and commissioned. Students will also learn the various parameters building designers have to consider including meeting the requirements from the local standards and codes.

## **COMMON MODULE:**

*Power Engineering, Electric Transportation, and Marine & Offshore Electrical Systems Specialisations*

### **Control & Automation**

This module examines the characteristics and designs of the industrial automation process. Two main areas will be covered - continuous feedback control and discrete sequential control. Topics in continuous feedback control include system concept and applications, process characteristics, control strategies, system performance, design of

controllers/compensators, and modern digital control systems. Topics in discrete sequential control include system concept and applications, and design tools.

**COMMON MODULE:**

*Electronics, Power Engineering, and Marine & Offshore Electrical Systems Specialisations*

**Power Electronics**

This module deals mainly with the applications of power semiconductor devices for the control and conversion of electric power. The objective is to provide students with a broad understanding of the various power conversion circuits and their industrial applications. The principles of operation and analysis of power conversion circuits such as AC to DC converters, DC to DC converters, DC to AC converters, and AC power controllers are studied in detail together with their applications.

**COMMON MODULE:**

*Electronics and Solar Technology Specialisations*

**Photovoltaic & Cell Fabrication Technology**

This module provides students with fundamental knowledge on the operation principles and behaviour of solar cells and modules including spectral response effect of temperature, parasitic resistance and cell efficiency. Students learn about PV cells interconnection, module fabrication and circuit design. This module also provides hands-on training for students in the NP cleanroom as well as the opportunity to learn how to fabricate solar cells in the laboratory.

**COMMON MODULE:**

*Engineering Management Specialisation and Minor in Business Management*

**E-Commerce Technology & Applications**

This module begins with a brief history of the Internet and e-commerce, and goes on to cover the planning aspects of setting up an e-commerce site and the factors that attract surfers to return to it. Technical ecommerce topics include Hypertext Markup Language (HTML), VBScript, Structured Query Language (SQL), Active Server Pages (ASP .NET) and mobile Web applications (.NET Mobile). These technologies allow an e-commerce site to be data-driven - a dynamic site that provides relevant and up-to-date information with powerful search capability.

**COMMON MODULE:**

*Audio-visual Technology and Electronics Specialisations*

**Electronic System Design**

In this module, students will learn how to design a basic electronic system in the control of electrical equipment and drive systems. The practical considerations will be emphasised through design examples and case studies. The topics covered include the selection of a wide range of electronic devices such as passive and active discrete devices, and op amps for specific applications and the interpretation of manufacturers' datasheets. There will be hands-on laboratory work and the introduction of software design aids to carry out the electronic design tasks.

**COMMON MODULE:**

*Engineering Management and Power Engineering Specialisations, and Minor in Business Management*

**Power System Economics & Energy Market**

This module aims to equip students with a basic understanding of the economic principles underlying the introduction of competition in the electricity industry. Students will explore the structure, operation and regulations of Singapore's electricity market, which was introduced to promote the efficient supply of competitively priced electricity and open up the wholesale and retail market for full competition.

**COMMON MODULE:**

Engineering Management, Power Engineering and Solar Technology Specialisation

**Power Distribution & Protection**

In this module, students will gain a basic knowledge of high voltage and low voltage distribution systems, related equipment and protection devices. Topics include fault calculation, principles of operation of switching devices, switchboards, transformers and cables, and the economic aspects of power distribution systems. Laboratory sessions include the testing of protection devices, operation of electrical equipment, and familiarisation with the safety requirements and precautions to be taken in the operation and maintenance of electrical apparatus.

**COMMON MODULE:**

Engineering Management, Power Engineering, Solar Technology and Marine & Offshore Electrical Systems Specialisations, and Minor in Business Management

**Design & Operation of Photovoltaic 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. Topics include concept of PV standalone and on-grid systems, sizing of cables and batteries, lightning protection, power protection and power quality issues.

**COMMON MODULE:**

Engineering Management, Power Engineering, Solar Technology and Marine & Offshore Electrical Systems Specialisations, and Minor in Business Management

**Engineering Contract & Project Management**

This module provides students with an understanding of the various aspects of electrical contracting and management procedures. Upon completion of this module, they will be able to prepare competitive bids for submission of tenders for projects pertaining to electrical services. They will also be able to apply the knowledge gained in project/contract management. Topics covered include contract arrangements and condition of contracts, cost planning, tendering procedures, specification writing, interim certificates and payments, completion and final payment, as well as variations and their valuation.

**COMMON MODULE:**

Audio-visual Technology, Electronics, Engineering Management, Engineering Product Development, Power Engineering, Solar Technology and Electric Transportation Specialisations, and Minor in Business Management

**Electrical Installation Design**

Students will learn how to design electrical systems for residential, commercial and industrial installations. Topics include the design of artificial lighting systems, selection of protective devices for various distribution networks, sizing of cables and circuit protective conductors, and estimation of load requirements for large buildings. On completion of the module, students will be able to design electrical distribution systems in compliance with statutory requirements

**MINOR IN BUSINESS MANAGEMENT****Starting & Managing an Enterprise**

Through this module, students generate business ideas and propose how these ideas can be developed into a business plan incorporating operational and financial requirements and marketing strategies for a new enterprise. In addition, students will learn how the principles of management can be applied to organise and develop the enterprise. Topics covered include entrepreneurial concepts and issues, business entry and exit strategies, types of business ownership, sources of business financing, venture launch and management principles.

## **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.

### **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.

### **Project Design & Business Application**

In this module, students are expected to integrate the knowledge they gained during the first two years of study and undertake a six-month long project in the field of Electrical Engineering. They will also be required to develop a business proposal/plan which forms an integral part of the whole project.

## **BUSINESS MANAGEMENT ELECTIVES**

Students are to choose *one* of the three electives below:

### **Managing Service Operations**

This module introduces the operations in service organisations and the use of techniques for designing, planning, organising and controlling resources for the delivery of goods and services to meet customers' needs and organisational objectives. Concepts covered include service facility, managing facilitating goods, forecasting demand, managing waiting lines, process improvement, inventory management, service supply relationship and service quality.

### **Supply Chain Management**

This module introduces students to the process of planning, implementing, controlling the operations of the supply chain. It will cover the movement and storage of raw materials, work-in-process inventory and finished goods from point-of-origin to point-of-consumption. The module also emphasises the effect supply chain management has on the success and profitability of the organisation.

### **Understanding Buyer Behaviour**

The module provides students with a basic understanding of buyer behaviour concepts. It explores various influencing factors that affect buyer decisions. Buyers could be consumers or corporate buyers. Topics covered include consumer decision-making processes, perceptions and attitudes, consumer demographics and lifestyles, and cultural and group influences.

## **DIPLOMA PLUS PROGRAMME**

The Diploma Plus Programme (DPP) is designed to provide students with proficiency in a selected domain area, either to broaden or deepen their knowledge/ skills in their main discipline of study, or to equip them with additional professional knowledge that would better prepare them for further study or increase their employability. Students can select elective modules from a wide range of clusters to obtain their Diploma Plus Certificate. DPP is optional and it will not affect the graduating requirement for the award of a diploma.

Students can choose the DPP clusters from the list below. The offer of a DPP cluster is subject to the condition that the minimum class size is met and based on available vacancies.

**Engineering Clusters**

- Applied Physics#
- Industrial Control (World Skills Singapore)
- Satellite Technology
- Stage Management & Technology

**Other available Diploma Plus Certificates**

- Advanced Engineering Mathematics\*
- Business\*\*
- Innovation Management
- Foreign Languages

# The Applied Physics syllabus is aligned with the NTU's FE1012: Physics A module. NP students who obtain good grades in the Applied Physics modules will be granted exemption from the FE1012: Physics A module.

\* The CAEM syllabus is aligned with the 'A' Level H2 Pure Mathematics syllabus. NP graduates who have successfully completed the revised CAEM will be granted exemption from the NUS' MA1301 Proficiency Test.

\*\* Students pursuing the Minor in Business Management cannot take the DPP Certificate in Business (CIB).