

## COURSE CURRICULUM

Module Name	Credit Units
<b>YEAR 1</b>	
<b>Level 1.1 (25.5 hours per week)</b>	
Career & Professional Preparation I	1.5
Computer Programming	4
Electrical Technology	4
Electronic Measurement & Prototyping Skills	3
Engineering Mathematics 1	5
Engineering Mechanics	4
Innovation Toolkit 1 ^	2
Sports & Wellness ^	2
<b>Level 1.2 (27 hours per week)</b>	
Applications Programming	4
Digital Logic	3
Discrete Analogue Electronics	6
Electronic Design Prototyping 1	3
Engineering Mathematics 2	5
Communication & Contemporary Issues^	4
Innovation Toolkit 2 ^	2

## MINOR IN BUSINESS MANAGEMENT

Module Name	Credit Units
<b>YEAR 1</b>	
<b>Level 1.1 (22.5 hours per week)</b>	
Career & Professional Preparation I	1.5
Computer Programming	4
Electrical Technology	4
Engineering Mathematics 1	5
Engineering Mechanics	4
Innovation Toolkit 1 ^	2
Sports & Wellness ^	2
<b>Level 1.2 (27 hours per week)</b>	
Applications Programming	4
Digital Logic	3
Discrete Analogue Electronics	6
Electronic Measurement & Prototyping Skills	3
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.

**COURSE MODULES****LEVEL 1.1****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.

**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.

**Electronic Measurement & Prototyping Skills**

This module equips students with the necessary hands-on practical skills in electronic circuit construction and measurements. Students will be introduced basic practical skills such as soldering, identification of components and use of various electronic instruments.

**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 with the application requirements in engineering modules. The emphasis in each topic is on applications and problem solving. Topics include algebra, trigonometry, logarithms, plane analytic geometry, matrices and complex numbers.

**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.

## LEVEL 1.2

### Applications Programming

This practice-oriented module equips students with the fundamental knowledge and skills required to develop Windows applications. The students will develop conceptual understanding to design and develop applications to solve business and engineering problems. Main topics include branch and loop, array, data files accessing and methods.

### Digital Logic

This module provides students with the fundamental knowledge and skills in logic design. Students will learn about the combinational and sequential logics and how to design and use them to control digital systems. A project will be used to reinforce students' learning and help them to relate their learning to real-life examples.

### Discrete Analogue Electronics

The aim of this module is to lay a foundation in electronics. It will cover concepts pertaining to analogue devices. With the fundamentals of basic circuit theory frequently revisited, the module will deal with the operating characteristics, working principles and applications of discrete electronic devices such as the various types of diodes, MOSFETs and BJTs. Practical circuits will be used to enhance and strengthen the students' knowledge so that they will acquire the relevant competencies to move on to more specialised modules. This module is the prerequisite for the Analogue Circuit Design and Applications module.

### Electronic Design Prototyping 1

This module builds upon the skills learned in the Electronic Measurement and Prototyping Skills module. The main objectives of this module are electronic circuit construction, measurement and simple troubleshooting techniques. Students will be introduced Computer- Aided Design (CAD) tools to design Printed Circuit Board (PCB) of simple circuits.

### 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. Topics include further trigonometry, differentiation with applications, and basic integration with applications.

## COURSE CURRICULUM

Module Name	Credit Units
<b>YEAR 2</b>	
<b>Level 2.1 (25 hours per week)</b>	
Analogue Circuit Design & Applications	5
Digital Electronics	5
Electronic Design Prototyping 2	4
Engineering Mathematics 3A	4
Object-Oriented Programming	5
Interdisciplinary Studies (IS) elective ^	2
<b>Level 2.2 (23 to 25 hours per week)</b>	
<b>Common Modules</b>	
Career & Professional Preparation II	2
Electronic Design Prototyping & Manufacturing	4
Microcontroller Programming & Interfacing	5
Telecommunication Principles	5
Interdisciplinary Studies (IS) elective ^	2

**AEROSPACE ELECTRONICS SPECIALISATION**

Avionics Systems	3
Fundamentals of Aerospace Technology	3

**COMPUTER & MOBILE TECHNOLOGY SPECIALISATION**

Mobile Application Programming	5
--------------------------------	---

**DIGITAL MEDIA & COMMUNICATION SPECIALISATION**

Data Communications	3
Digital Communications	3

**MICROELECTRONICS SPECIALISATION**

Integrated Circuit Design & Technology	3
Water Fabrication Fundamentals	4

**NETWORK SYSTEMS & SECURITY SPECIALISATION**

Data Communications	3
Digital Communications	3

**MINOR IN BUSINESS MANAGEMENT**

Module Name	Credit Units
<b>YEAR 2</b>	
<b>Level 2.1 (25 hours per week)</b>	
Analogue Circuit Design & Applications	5
Career & Professional Preparation II	2
Digital Electronics	5
Electronic Design Prototyping 1	3
Engineering Mathematics 3A	4
Fundamentals of Financial Management	4
Business & the Economy ^	2
<b>Level 2.2 (26 hours per week)</b>	
Data Communications	3
Electronic Design Prototyping 2	4
Internet Technology	3
Marketing Fundamentals	4
Microcontroller Programming & Interfacing	5
Telecommunication Principles	5
Effective People Management ^	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.

## **COURSE MODULES**

### **LEVEL 2.1**

#### **Analogue Circuit Design & Applications**

This module introduces students to the operating principles of commonly used analogue devices and circuits, such as operational amplifiers, oscillators and filters. Applications in various practical circuits are also illustrated.

#### **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.

#### **Digital Electronics**

This module covers the fundamentals of digital electronics. The basic principles and techniques of digital system and design are covered. It prepares the students for subsequent modules that discuss microprocessors and microcomputers. The main topics covered are number systems, Boolean Algebra, combinational logic circuits and minimisation techniques, flip-flops and multivibrators, IC counters, and data handling devices. Characteristics of standard TTL and high speed CMOS are also discussed.

#### **Electronic Design Prototyping 2**

This module builds upon the skills learned in the module, Electronic Design Prototyping 1. The main objectives of this module are to introduce prototyping and testing techniques, fault simulation and fault finding used in electronic project design. Students will also use CAD tools to design PCB of more complex circuits.

#### **Engineering Mathematics 3A**

This module is designed to provide students with further mathematical skills to solve basic engineering related problems. The topics are introduced in an order that is intended to keep abreast of the application requirements in their other engineering modules. Topics included in this module are integration with applications, differential equations, Laplace Transform and Fourier Series.

#### **Object-Oriented Programming**

This module builds on the foundation of the Applications Programming module and introduces the concepts of Object-Oriented Programming to the students. It covers the area from the fundamental concepts of Object-Oriented Programming to Web forms, database access, and some graphics and animation.

#### **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.

### **LEVEL 2.2**

### **Avionics Systems**

This module provides students with an appreciation of aircraft electronic systems. It includes topics such as cockpit instrumentation, aircraft navigation, communication, surveillance, control and lighting electronics. This module equips students with the knowledge required for the advanced module such as Aircraft Navigation & Communication Systems (ANCS).

### **Data Communications**

This module will train students to understand and apply key concepts and processes associated with data transmission of information, transmission media, the OSI reference model, network topologies, protocols and TCP/IP protocol suite. This module provides the foundation for understanding principles in data communications and networking.

### **Digital Communications**

This module introduces students to the fundamental concepts of digital communications. Students will be taught the various coding and digital modulation techniques. The concept of error control coding techniques for reliable communications and spread spectrum modulation schemes will be taught.

### **Electronic Design Prototyping & Manufacturing**

This module builds upon the skills learned in the module, Electronic Design Prototyping 2. The main objective of this module is to learn the necessary skills to undertake electronics project. Students will learn the complete process from prototyping to PCB design and CAM (computer-aided manufacturing) of more complex circuits. Students will also use CAD tools to design PCB of more complex circuits and to use these tools to produce files and libraries for circuit re-use and CAM of PCB.

### **Fundamentals of Aerospace Technology**

This activity-based module introduces students to the basics of aerodynamics and principles of flight and traces the development of the aerospace technology. It highlights the nature and scope of the aerospace industry, and the broad technical training for the profession. The module aims to create professional awareness in students.

### **Microcontroller Programming & Interfacing**

This module introduces students to the fundamentals of microcontroller programming and interfacing. C language programming is used to illustrate the operation of the microcontroller. Interfacing the microcontroller to basic input-output devices such as switches, LEDs, 7-segment displays and keypads help to demonstrate the behaviour of the application software running on a working system.

### **Mobile Application Programming**

This module will train students to develop applications for consumer mobile device platforms. Types of applications covered include those which are standalone, web-enabled, location-aware and client-server in nature. Students will also learn to develop and deploy interactive mobile applications using both client-side and server-side programming techniques with database integration.

### **Telecommunication Principles**

This module introduces students to radio communication. It builds an understanding of the basic concepts of analogue communication systems. The characteristics of a basic communication system and the environmental factors that affect communication will be discussed. The concepts that are necessary for an understanding of linear systems will be explained, with an emphasis on resonance and filters. Students will be taught the fundamental concepts of analogue modulation and demodulation techniques such as AM and FM and their applications.

## **MICROELECTRONICS SPECIALISATION**

### **Integrated Circuit Design & Technology**

This module introduces students to various Integrated Circuit (IC) technologies and provides students with basic integrated circuit design concepts using Metal- Oxide-Semiconductor (MOS) technology. It also equips students with the basic practical skills that are needed to design and layout simple digital circuits on silicon.

### Internet Technology

The module covers the concept of the Web operations and also the tools used for developing Web-based applications. Students will learn the basics of HTML, Java language, JSP, JDBC and JavaScript so that they are able to develop multiple-tier Web-based database applications.

### Marketing Fundamentals

The module introduces concepts and principles of the 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 P's in marketing, topics covered also include segmentation, targeting and positioning, product mix, service marketing, channel decisions and branding.

### Wafer Fabrication Fundamentals

This module provides students with basic knowledge of IC fabrication. The processes that are required to convert a blank wafer to one that is covered with complex circuits are covered. It covers silicon ingot growth, wafer preparation, photolithography and etching. Yield and reliability as they pertain to IC fabrication are also covered. In addition, it will provide students with fundamental knowledge of various supporting technologies required in the wafer fabrication industry such as vacuum and pressure measurement systems. Finally, process and device simulations are covered with students undertaking a simulation exercise building and operating their own virtual transistors.

## COURSE CURRICULUM

Module Name	Credit Units
<b>YEAR 3</b>	
<b>INTERNSHIP</b>	
<b>Level 3.1 (23 to 25 hours per week)</b>	
<b>Common Modules</b>	
Fundamentals of Control Systems	5
Interdisciplinary Studies (IS) elective ^	2
World Issues: A Singapore Perspective ^	2
<b>COMPUTER &amp; MOBILE TECHNOLOGY SPECIALISATION</b>	
Computer Systems Architecture & Administration	5
Data Communications	3
Digital Communications	3
Mobile Device Technology	5
<b>DIGITAL MEDIA &amp; COMMUNICATION SPECIALISATION</b>	
Digital Audio, Video Processing & Applications	5
Digital Media Technologies & Communication	5
Digital Signal Processing	5
<b>MICROELECTRONICS SPECIALISATION</b>	
Advanced Wafer Fabrication Technology	5
Data Communications	3
Digital Communications	3
Integrated Circuit Packaging, Assembly & Test	3

**NETWORK SYSTEMS & SECURITY SPECIALISATION**

Basic Routing & Switching	6
Cloud Computing & Data Centre	5
Linux Servers	4

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

6-Month Internship	22
--------------------	----

**NON-INTERNSHIP****Level 3.1 (22 to 25 hours per week)****Common Modules**

Project Design & Development 1	10
Interdisciplinary Studies (IS) elective ^	2
World Issues: A Singapore Perspective ^	2

**AEROSPACE ELECTRONICS SPECIALISATION**

Aerospace System Design	4
Fundamentals of Control Systems	5

**COMPUTER & MOBILE TECHNOLOGY SPECIALISATION**

Fundamentals of Control Systems	5
Mobile Device Technology	5

**DIGITAL MEDIA & COMMUNICATION SPECIALISATION**

Digital Media Technologies & Communication	5
Digital Signal Processing	5

**MICROELECTRONICS SPECIALISATION**

Advanced Wafer Fabrication Technology	5
Digital Communications	3

**NETWORK SYSTEMS & SECURITY SPECIALISATION**

Basic Routing & Switching	6
Cloud Computing & Data Centre	5

**Level 3.2 (21 to 23 hours per week)****Common Module**

Project Design & Development 2	12
--------------------------------	----

**AEROSPACE ELECTRONICS SPECIALISATION**

Aircraft Navigation & Communication Systems	5
Data Communications	3
Digital Communications	3

**COMPUTER & MOBILE TECHNOLOGY SPECIALISATION**

Computer Systems Architecture & Administration	5
--	---

Data Communications	3
Digital Communications	3

#### **DIGITAL MEDIA & COMMUNICATION SPECIALISATION**

Digital Audio, Video Processing & Applications	5
Fundamentals of Control Systems	5

#### **MICROELECTRONICS SPECIALISATION**

Data Communications	3
Fundamentals of Control Systems	5
Integrated Circuit Packaging, Assembly & Test	3

#### **NETWORK SYSTEMS & SECURITY SPECIALISATION**

Fundamentals of Control Systems	5
Linux Servers	4

### **MINOR IN BUSINESS MANAGEMENT**

<b>Module Name</b>	<b>Credit Units</b>
<b>YEAR 3</b>	
<b>INTERNSHIP</b>	
<b>Level 3.1 (25 hours per week)</b>	
Business Management Elective	4
Computer Systems Architecture & Administration	5
Digital Communications	3
Fundamentals of Control Systems	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 Internship	22
<b>NON-INTERNSHIP</b>	
<b>Level 3.1 (25 hours per week)</b>	
Business Management Elective	4
Digital Communications	3
Project Design & Business Application 1	10
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>	

Computer Systems Architecture & Administration	5
Fundamentals of Control Systems	5
Project Design & Business Application 2	12

**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.

## **COURSE MODULES**

### **LEVEL 3.1 & 3.2**

#### **6-Month Internship**

In this module, students will be attached to sponsoring companies for a period of approximately six months. During their internships, students will undertake projects assigned by the company or be involved in operations or maintenance-related work. Student internships may be undertaken locally or overseas.

#### **Fundamentals of Control Systems**

This module provides students with a basic coverage of feedback control systems. The topics cover basic concepts of automatic control, components of control systems, simple analytical tools, and stability analysis of systems. Students are also introduced to the use of Matlab/Simulink as a computer tool in control systems analysis.

#### **Project Design & Development 1**

In this module, students will work in teams of two or three to design and implement a project that demonstrates their engineering skills as well as teamwork over a period of two semesters. The module is structured to encourage creativity and innovative thinking. This will also help students to develop a positive work attitude and good team spirit.

#### **Project Design & Development 2**

This module follows on from Project Design and Development 1. Students are required to demonstrate their ability and resourcefulness in implementing their selected project design solution. The scope of work includes printed circuit board fabrication, wiring, assembly and testing of the final prototype according to the specifications and requirements defined in Project Design and Development 1. In addition, software based projects may require database coding, operating system implementation and testing, server and client system design, portable design field test and Web-based integration.

### **COMMON MODULES:**

*Aerospace Electronics, Computer & Mobile Technology, and Microelectronics specialisations and the Minor in Business Management*

#### **Data Communications**

This module will train students to understand and apply key concepts and processes associated with data transmission of information, transmission media, the OSI reference model, network topologies, protocols and TCP/IP protocol suite. This module provides the foundation for understanding principles in data communications and networking.

#### **Digital Communications**

This module introduces students to the fundamental concepts of digital communications. Students will be taught the various coding and digital modulation techniques. The concept of error control coding techniques for reliable communications and spread spectrum modulation schemes will be taught.

### **AEROSPACE ELECTRONICS SPECIALISATION**

#### **Aerospace System Design**

This module aims to provide students with the basic understanding of the process of avionic system design, analysis and integration. Concept and fundamental understanding of flight control, avionic instruments, closed loop control system and PID Controllers will be introduced. Apart from the concept and theory introduced, another aspect of the learning experience will be through hands-on practical sessions and mini project.

### **Aircraft Navigation & Communication Systems**

This module provides students with the theory of operations and the functional description of airborne navigation and communication systems found in modern aircraft. Systems covered include ADF, VOR, DME, IRS, HF & VHF. The standard digital data-bus communications protocol, such as ARINC 429 and ARINC 629 used by commercial aircraft and MIL-STD- 1553B used by military aircraft, will also be discussed.

### **COMPUTER & MOBILE TECHNOLOGY SPECIALISATION**

#### **Computer Systems Architecture & Administration**

This module will equip students with competencies to describe the architecture of a general purpose computer system, explain the function of its hardware and be able to administer the software to operate it in a server-based computing environment.

#### **Mobile Device Technology**

This module introduces the essential elements of a mobile computing platform. These include single-board computers, high-performance embedded systems, mobile operating systems, sensory devices (such as GPS, accelerometer, compass and camera), and wireless sensor networks. Student will apply the knowledge to integrate the various elements and develop different real-life applications.

### **DIGITAL MEDIA & COMMUNICATION SPECIALISATION**

#### **Digital Audio, Video Processing & Applications**

This module covers the fundamentals of human hearing and visual systems in relation to the development of digital audio, image and video processing techniques. A detailed coverage of audio, image and video compression techniques and standards is included. Examples of applications in digital audio and video storage and processing standard used in digital radio and TV, portable media devices e.g. MP3 players and home digital entertainment systems will also be included.

#### **Digital Media Technologies & Communication**

This module gives an overview of digital media technologies (online & mobile media, print & publishing, film & video, interactive media, etc.), and techniques for transmission of digital media contents. Students will also learn the application of these techniques in various multimedia systems, such as radio & TV systems, satellite communications and mobile media technologies.

#### **Digital Signal Processing**

This module provides students with knowledge of Digital Signal Processing (DSP) technology and equips them with practical skills in DSP software and hardware implementation. It will also provide students with the ability to work on various advanced digital signal processors.

### **MICROELECTRONICS SPECIALISATION**

#### **Advanced Wafer Fabrication Technology**

This module focuses on the silicon wafer fabrication process with emphasis on practice-oriented training in the cleanroom. Liquid Crystal Display Technology will also be covered.

#### **Integrated Circuit Packaging, Assembly & Test**

This module aims at providing students with an introductory knowledge in Integrated Circuit (IC) Assembly and Testing technology so as to prepare them for the semiconductor manufacturing environment in their careers. It covers basic IC packaging, surface-mount board assembly, statistical process control, IC testing methodology and reliability as well as failure analysis of IC.

## **NETWORK SYSTEMS & SECURITY SPECIALISATION**

### **Basic Routing & Switching**

This module covers the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. At the end of this module, students will be able to configure and troubleshoot routers and switches and resolve common issues with RIPv1, RIPv2, single-area OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks, access control lists, DHCP and NAT.

### **Cloud Computing & Data Centres**

This module provides an overview of cloud computing and data centres. Concepts include virtualisation as a foundation for cloud computing, issues related to the implementation of cloud computing and data centres, cloud services like Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). It also covers simple architecture, design, implementation, management and security of public and private clouds.

### **Linux Servers**

This module covers the basics of Linux operating system and server. Concepts include the use of Linux commands to access and manage directories, files, setting of file security and access rights and basic servers' implementation such as DNS and DHCP in a network.

## **MINOR IN BUSINESS MANAGEMENT**

### **Computer Systems Architecture & Administration**

This module aims to equip students with the competencies to describe the architecture of a general purpose computer system, explain the function of its hardware and be able to administer the software to operate it in a server-based computing environment.

### **Project Design & Business Application 1**

The objective of this module is to enable students to apply the concept of engineering, marketing, and financial management, learnt during the course of their study, in completing a final-year project with business application. The concept of business application shall be introduced and applied at different stages of product design and development cycle. Students will have opportunities to integrate engineering and business concepts, market research and strategy, in the design and development of a product. The design of a product will be developed based on the need of a specific industry or targeted users/stakeholders. While integrating the engineering and business concepts, the financial aspects of developing a product will also be incorporated into the product design and development.

### **Project Design & Business Application 2**

This module is a continuation of Project Design & Business Application 1. Students are required to demonstrate their ability and resourcefulness in constructing and completing engineering experimental model(s) to demonstrate the functionality and feasibility of engineering design(s) of their identified solution(s) to meet and fulfil users'/stakeholders' needs and experiences identified in Project Design & Business Application 1.

### **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.

## **BUSINESS MANAGEMENT ELECTIVES**

### **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.