

## **INFORMATION TECHNOLOGY COURSE MODULES**

Develop innovative IT solutions that increase business competitiveness and enhance the quality of life, or even start your very own e-business, with a Diploma in Information Technology (IT).

In your first year, you will focus on core computing skills in programming, networking, databases and enterprise information systems. You will also be given the opportunity to investigate IT-related topics and develop your digital portfolio.

In your second year and third year, you are free to choose from a myriad of electives that suit your interests and passion.

In your final year, you will round off your learning journey with a six-month local or overseas internship with organisations such as KPMG, IBM, Singtel and Microsoft, or launch your own IT business ideas at our technology hubs. You can also work on a capstone project which will beef up your digital portfolio and impress your future employer!

Depending on your passion, you may choose electives from the following areas of interest:

### **Business & Data Analytics**

Acquire knowledge and skills in business intelligence, quantitative analysis, data visualization and predictive analytics to help companies gain a competitive edge.

### **Cloud Computing**

Learn about cloud architecture and technologies, design cloud databases, develop cloud applications, and understand data centre management.

### **Enterprise Solutioning**

Develop business strategies and offerings for the service economy, fulfil customer needs, and improve an organisation's competitive edge.

### **Games Programming**

Create computer games by applying knowledge and skills related to programming, physics and artificial intelligence.

### **Infocomm Sales & Marketing**

Market IT goods or services to businesses and consumers, develop sales and marketing strategies, and understand sales life cycle management.

### **Mobile Business Applications**

Learn about mobile commerce by designing, developing, securing and optimising mobile apps.

### **Solutions Architect**

Design and implement computer solutions using algorithms and data structures to solve business problems efficiently and cost-effectively

## **LEVEL 1.1**

### **Computing Mathematics**

This module introduces the basic concepts of relations and functions, matrices, statistical methods and relevant applications. The main emphasis is to develop students' ability in solving quantitative problems in computing mathematics, probability and statistics.

### **Cyber Security Fundamentals**

This module provides an overview of the various domains of cyber security. It helps develop an understanding of the importance of cyber security in today's digital world. It aims to provide an appreciation of cyber security from an end-to-end perspective. It covers fundamental security concepts, tools and techniques in domains such as data, end-user,

software, system, network, physical, organisation, and digital forensics. It also helps develop knowledge and skills in identifying common cyber threats and vulnerabilities, and to apply techniques to tackle these issues.

### **Enterprise Information Systems**

Companies today are adopting the use of technology not just to assist them in their day-to-day operations but also gain an advantage over their competitors. Many companies are implementing enterprise-wide information systems that provide them with platforms to integrate and coordinate their business processes. The use of enterprise information systems has become a necessity in multi-national companies (MNCs) as well as small and medium enterprises (SMEs). Within an enterprise information system, there is an intricate relationship between business strategy, organisational structure, business processes and technology resulting in challenges and issues during implementation.

This module introduces students to the different components that build up an enterprise information system. Different types of information systems are used for business processes, from communication and order processing to data analysis for decision making, and in almost all business functions ranging from marketing, sales, procurement, and human resource, to product development and manufacturing, accounting and finance.

Students will learn about the organisations and mapping the business processes to draw the activity diagram flows. It is essential for students to understand how information systems are used to help organisations and they are expected to suggest solutions and new uses of information systems to solve business problems. This will enhance their IT and business processes knowledge to prepare them for future modules, future employment or even future entrepreneurship.

### **Fundamentals for IT Professionals I**

This module provides a broad introduction to the field of IT by exploring the roles, professional practice, ethical expectations and career development paths of IT professionals. Through a guided inculcation of interpersonal and team work skills with strong team bonding spirit, the module aims to deepen students' commitment to the sector that the course prepares them for. In addition, students will be required to begin charting their career path in the IT industry by considering crucial aspects such as personal preferences and aptitude, job roles and responsibilities, skills needed and further education.

### **Programming I**

This module introduces the fundamentals of programming and how to develop programs using appropriate problem-solving techniques in a modular style. In this practice-oriented module, students are taught how to apply problem-solving skills using a top-down structured programming methodology and given ample practice in translating solutions into computer programs, then test and debug the programs. Topics include data types, variables, expressions, statements, selection structures, loops, simple computation and algorithms, and the use of libraries.

Students will also practise the use of pseudocodes, best practices of programming, debugging techniques with the help of tools, development of test cases, and suitable program documentation. In addition, they will study various areas where application software plays a prominent part in helping organisations solve problems. Students will be given ample opportunity for independent and self-directed learning.

## **LEVEL 1.2**

### **Databases**

Today's business organisations depend on information systems in virtually all aspects of their businesses. Corporate databases are set up to hold the voluminous business transactions generated by these information systems. This module introduces students to the underlying concepts of database systems and how to model and design database systems that reflect business requirements. Students will be taught how to analyse data needs, model the relationships amongst the data entities, apply normalisation process to relations and create the physical database. Skills to be taught include data modelling technique, transformation of data model to relations, normalisation technique and SQL (Structured Query Language).

## Front End Development

This module teaches the fundamental skills required to develop responsive websites that are optimised for mobile and desktop viewing. The students would attain skills and knowledge in programming languages such as HTML, CSS, JavaScript, jQuery, and AJAX which are used to develop interactive websites. This allows students to develop a website with interactive elements, providing them with a tangible product that they can develop into an interactive resume application and e-Portfolio website.

## Operating Systems & Networking Fundamentals

This module focuses on the fundamentals and principles of operating systems. It explains what general operating systems are and what they do. The module teaches concepts that are applicable to a variety of operating systems such as Windows and Linux. Students will learn about the different number and character representation methods such as binary, hexadecimal and ASCII. Concepts including processes, physical and virtual memory, files and directories, file systems, shell and OS commands will be covered.

The module also covers the terminology and technologies in current networking environments and provides a general overview of the field of networking as a basis for subsequent related modules in the course. Topics relating to types of networks, network topologies, network technologies and layered protocol architectures will be taught. In addition, the students will also learn the OSI model to understand data networks and understand commonly used network systems such as Ethernet. As TCP/IP is deployed in most of today's network architecture, the topic will be discussed in detail. An overview of internetworking will also be presented to allow students to have a global picture of how local area and wide area networks are interconnected in the real world.

## Portfolio I

This module provides students with the opportunity to apply the knowledge and skills gained from the various modules in the course to date, and explore topics in IT that they have a personal interest. Students may choose to undertake a real-life IT project, a competition-based project or a research and development project. The chosen project should result in the subsequent deliverable of artefacts that are suitable for their personal portfolios. Through the project, students have opportunities to work in teams, work on real-world problems, and build up their personal portfolios.

## Programming II

This module builds upon the knowledge and skills acquired in Programming 1 (PRG1). It aims to provide opportunities for the students to develop medium-scale applications based on the Object-Oriented (OO) approach. A suitable object-oriented high-level programming language will be used for students to continuously apply their problem-solving skills. The main concepts of OO and the implementation of applications using the OO approach will be taught in this module. The module may also cover the concepts of Abstract Data Types (ADTs) and the implementation of some selected ADTs using the OO approach.

Suitable sorting and search algorithms and the use of Application Protocol Interface (API) will be introduced when required. Other key topics include the introduction of system design concepts such as the class diagram. Software robustness and correctness, and good programming practices will be emphasised throughout the module. Independent and self-directed learning will also be encouraged.

## COURSE CURRICULUM

Module Name	Credit Units
<b>YEAR 1</b>	
<b>Level 1.1 (25 hours per week)</b>	
Computing Mathematics	4
Cyber Security Fundamentals	4
Enterprise Information Systems	4
Fundamentals for IT Professionals I	3
Programming I	4

Innovation Made Possible ^	4
Sports & Wellness ^	2
<b>Level 1.2 (24 hours per week)</b>	
Databases	4
Front-End Development	4
Operating Systems & Networking Fundamentals	4
Portfolio I	4
Programming II	4
Communication Essentials ^	4

**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.