InfoComm Technology (IT) and Interactive Digital Media (IDM) pervade many aspects of our lives today. In fact, in most parts of the world, lexicons such as Google, YouTube, Facebook, Twitter, Wikipedia and blogs have now become a part of everyday vocabulary.

This prevalence of IT and IDM has created a level-playing field—new businesses and revenue models sprout with the innovative use of IT and IDM, and technocrats with creative ideas are able to realise their dreams of creating something used by the world.

Ngee Ann Polytechnic’s School of InfoComm Technology (ICT) is a leader in providing quality IT and IDM education. Established in 1982, it has since nurtured more than 8,000 IT professionals; many of whom have assumed influential positions in various organisations. Some have even founded their own IT ventures.

ICT has established a reputation for delivering a broad-based and holistic IT education that is industry-relevant and solution-focused. We review and update our curriculums on a regular basis to keep pace with evolving developments in the field. The courses also undergo stringent review and endorsement by an independent Advisory Committee comprising of high-standing industry and university representatives.

Students enjoy a total learning experience in a collegial atmosphere, with the flexibility to specialise in niche areas of IT, while broadening their perspectives with a selection of interdisciplinary studies.

Upon graduation, they find that their diplomas are internationally recognised, making it easy for them to secure advanced standing at many good local and overseas universities.

COURSES OFFERED

ICT offers the following courses to meet the industry demand for specialist IT manpower:

- Diploma in Financial Informatics (FI)
- Diploma in Information Technology (IT)
- Diploma in Multimedia & Animation (MMA)
MAJOR ACHIEVEMENTS

IT Award Winners

ICT students have proven their prowess in both national and international IT competitions and awards.

- ICT Gold Medallist and IT graduate Ang Jin Hui won the prestigious Lee Kuan Yew Award in 2009. The award recognises well-rounded students who have excelled in both academic and non-academic spheres.

- Alumnus Rakesh Guptar was awarded the National Young IT Professional 2009 Award for his exemplary leadership in the IT arena and for leading Heulab Pte Ltd – an education software company which he co-founded with fellow alumnus Lim Soon Jinn – to serve the global market. He was also awarded the Singapore Indian Young Entrepreneur Award in 2007 by the Singapore Indian Chamber of Commerce and Industry and DBS Bank.

- At the Outstanding All-Rounder Student awards (OARS) 2009, MBS student Maimunah Bte Nokman managed to clinch the CDC-level award while IT student Ang Jin Hui claimed school-level honours. Awarded by the North West Community Development Council, these awards recognise the top all-rounder students in the community. Maimunah was also one of the four finalists of the prestigious National IT Youth Award in 2009.

- IT students Lau Han Yang, Germaine Tay Shi Hui and Toh Koh Li emerged champions in the National Splash Awards 2008, organised by the Singapore Computer Society.

- For the third time running and since the competition’s inception, ICT was declared the National Champion in the 2008 National Infocomm Competition (NIC). Organised by the IDA, NIC features the top prize of a fully-sponsored trip to the Microsoft Redmond Campus and Silicon Valley.

- IT student team Bui Huy Quang Vu, Chen Kun and Lau Han Yang emerged champions in the polytechnic category of the National Algo*Mania Competition. Modelled after the prestigious worldwide ACM ICPC competition for university students, Algo*Mania has a difficulty level similar to that of the National Olympiad in Informatics.

Scholarships for Academic Progression

- 2009 IT graduate and ICT Gold Medallist Ang Jin Hui claimed an NUS Undergraduate (Merit) Scholarship. He will be enrolling into the University Scholars’ Program for his Degree in Computing.

- IT graduates Jeremy Foo Jie You, Lee Jian Sheng, Lau Han Yang and Germaine Tay Shi Hui have been awarded National Infocomm Scholarships to pursue infocomm degree programmes.

- IT graduates Tan Shu Ren, Tan Choon Yan, Sangar s/o Annadorai and Kelvin Chng Soon Yeong have been awarded National Infocomm Scholarships to pursue four-and-a-half-year Direct Masters Programmes.

- IT graduate Lau Wei Lun, an IDA Silver Medallist in 2007, was awarded a DSTA Scholarship in 2007 to pursue a computing degree.

- IT graduate Jason Tan won an SAF Scholarship to pursue a Bachelor of Computer Science at the Australian National University.

- 2006 MMC graduate and ICT Gold Medallist Ng Yun Chi won a DSTA Scholarship to complete a four-and-a-half-year Direct Masters Programme at NTU and then, the Georgia Institute of Technology.

FACILITIES AND STAFF

ICT staff are armed with extensive infocomm and digital media qualifications and industry experience. A number had the experience of creating IT ventures and managing IT-related businesses, putting them in a good position to impart entrepreneurship skills to students.

ICT is well equipped with extensive, state-of-the-art computing resources, supported by high-speed wired and wireless networks in an open systems environment. The latest industry-standard software is used for teaching and learning.

Specialised labs are available for the development of skills in niche areas. For example, specialised networking labs are used for hands-on practical training. Each lab is individually configured to expose students to the latest networking technologies.

ICT was also the first tertiary institution to set up the Certiport Centre with NTUC CertCentral to facilitate the Microsoft Office Specialist certification.

Other collaborations with industry partners have led to the establishment of ICT’s technology hubs of eGarage® and The DOT®. The hubs were set up to nurture the students’ spirit of innovation and enterprise by allowing them to experiment and create using emerging technologies, in collaboration with staff and industry experts.

The eGarage® houses a state-of-the-art infocomm showcase as well as development labs open to ours and industry partners. These niche development labs are equipped with high-end hardware and software for teaching and project developments.

The DOT® supports our latest multimedia and animation course. It has a state-of-the-art sound recording studio, a drawing room, a blue room, as well as specialised multimedia labs equipped with advanced workstations capable of running resource-intensive multimedia applications. Students use multimedia software such as 3D Studio Max, Adobe Premiere and the Macromedia product suite to design interactive multimedia applications, create models and animation, and carry out digital video and sound editing.
To give our students an added edge in their future careers, ICT scopes out applied research and development projects to challenge them beyond classroom learning. For example, ICT students work on real-world projects for the tourism and hospitality sector with industry partners, as well as for the medical field with mentorship from the National University Hospital.

INDUSTRY COLLABORATIONS

The School enjoys strategic links with the industry by engaging in applied research and consultancy projects, and playing a proactive role in mutually beneficial partnerships and collaborations. We also provide market-oriented continuing education and customised training programmes.

ICT diplomas are developed with industry inputs, and with the IDA and MDA master plans in mind. For example, in the new Diploma in Financial Informatics, SAP applications – the world’s market leader in Enterprise Resource Planning (ERP) – are used to demonstrate how basic business processes are represented and integrated in a real-world business setting.

Students and teaching staff have the opportunity to take part in both local and overseas internships to expose them to global business practices. Students also have the chance to take part in overseas immersion programmes in China and India.

As a leading IT educational institute, ICT identifies emerging technologies and pioneers their adoption and implementation. For example, Ngee Ann was the first tertiary institute to pilot the use of wireless IP telephony in a large-scale, real-life environment through a partnership with Cisco Systems.

In another pioneering move, the School set up RHyMeS (RFID Hospitality Management Systems) – the first RFID R&D centre in Asia-Pacific that focuses on lifestyle, tourism and hospitality management. This collaboration with Motorola Electronics, Sun Microsystems and the largest hotel chain in Singapore – Millennium & Copthorne International – got students and staff working on real-world problems that the tourism and hospitality industry faces. They have since developed innovative applications that enhance service, enrich experience, and improve operational effectiveness and efficiency in hotels using radio-frequency identification (RFID) and complementary technologies. Some of these systems have been deployed in a real-world setting.

DIPLOMA PLUS PROGRAMME

The School of InfoComm Technology also offers three Diploma Plus Certificate Programmes. These are aimed at enhancing the value of a polytechnic education and improving the employability of NP graduates.

Certificate in Advanced Computing Mathematics (CACM)

Helps students build the stronger mathematics foundation needed for pursuing degrees in computing at both local and overseas universities. It is equivalent to a qualification in ‘A’ Level Mathematics; students with this certificate will be able to read all modules carrying ‘A’ Level Mathematics as prerequisite upon admission/matriculation to the National University of Singapore.

Certificate in Business Solutions Development (CBSD)

Equips students with the expertise needed to develop customised and integrated business office applications. They will learn to leverage on a wide-range of advanced development tools and use a full-featured language such as Visual Basic for Applications (VBA).

Certificate in Web Design & Development (CWD)

Provides students with an in-depth understanding of the concepts and techniques needed to develop web-based applications, Content Management Systems (CMS) and social networking websites.
The Diploma in Financial Informatics (FI) is a hybrid course that gives students a strong IT foundation with business knowledge in the dynamic Banking and Finance industry. It provides a unique curriculum combining the strengths of the School of InfoComm Technology and the School of Business & Accountancy.

The course provides students with cross disciplinary skills in both infocomm and finance. Students are equipped with skills in IT and business process management as well as hands-on experience with Enterprise Resource Planning (ERP) systems for the Banking & Finance industry.

Students learn relevant technical skills to analyse and manage financial data as well as business processes of enterprise systems that improve the business competitiveness within the finance sector. In the final year, students will undertake an internship to gain industrial experience.

Students also take several Interdisciplinary Studies (IS) modules that aim to broaden their minds and help them develop the spirit of innovation and enterprise. This is important for FI professionals working in a complex business environment, where problems are multi-faceted in nature and require knowledge and skills in different disciplines.

Students are required to own notebook computers.

### ENTRY REQUIREMENTS

To be eligible for consideration, candidates must have the following GCE ‘O’ Level examination (or equivalent) results and fulfill the aggregate computation requirements:

<table>
<thead>
<tr>
<th>Subject</th>
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<tbody>
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* Candidates must attain the required grade for English as a first language.

Candidates with severe vision deficiency should not apply for the course.

### CAREER PROSPECTS

Graduates from the course are trained to perform the role of Business Analysts, a critical role that bridges both business needs and technology. This gives them a head start in their careers with banking and financial institutions, SMEs, MNCs and the public service sector. With a strong understanding of the organisation’s business objectives, Business Analysts are able to value-add to the organisation by achieving operational effectiveness and efficiency for business operations.

### ACCREDITATION FOR FURTHER STUDIES

The Diploma in Financial Informatics is recognised by local and overseas universities, which offer advanced standing to our graduates.
## COURSE CURRICULUM

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Credit Units</th>
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<tbody>
<tr>
<td><strong>YEAR 1</strong></td>
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<tr>
<td><strong>Level 1.1 (29 hours per week)</strong></td>
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<tr>
<td>Fundamentals for IT Professionals</td>
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<td>Fundamentals of Programming</td>
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</tr>
<tr>
<td>Digital Devices &amp; Networking Technology</td>
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</tr>
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<td>Business Statistics</td>
<td>5</td>
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<tr>
<td>Accounting</td>
<td>5</td>
</tr>
<tr>
<td>Creativity &amp; Applied Thinking Skills^</td>
<td>2</td>
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<tr>
<td>Sports &amp; Wellness^</td>
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<td>Communication Toolkit^</td>
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<td><strong>YEAR 2</strong></td>
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<td>Developing Web Applications</td>
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<td>Enterprise Business Processes</td>
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<td>Databases</td>
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<td>Enterprise Project Management</td>
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<td>Prescribed Elective Module^</td>
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<td>Elective 1</td>
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<td>Elective 3</td>
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<td>World Issues: A Singapore Perspective^</td>
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<tr>
<td>Internship</td>
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</table>

### Notes:
* The modules in Levels 3.1 and 3.2 are offered on an interchangeable basis. You will undergo an Internship in your final year.
* The prescribed/elective modules offered may change from year to year, depending on relevance and demand. They may also include modules available in other diplomas offered by the School.
^ For more details on Interdisciplinary Studies (IS) modules, please log on to www.np.edu.sg/is/.

### IS Modules
The School of Interdisciplinary Studies (IS) delivers the interdisciplinary curriculum under the Ngee Ann Learning Model (NLM). The NLM was introduced in 2001 to nurture a new generation of professionals with multidisciplinary skills to meet the challenges of a knowledge-based economy. The NLM incorporates core disciplines and interdisciplinary studies. It also nurtures innovative and entrepreneurial traits through the Innovation & Enterprise in Action (I & E in Action) module. IS modules challenge boundaries and offer insights into Communication, Entrepreneurship, Life Skills, Media & the Arts, and Science & Technology.

## COURSE MODULES

### LEVEL 1.1

**Fundamentals for IT Professionals**
This module gives a broad introduction to the field of IT by exploring the roles, professional practice, ethical expectations and development paths of IT professionals. Students will appreciate the importance of problem solving skills in providing effective IT solutions. They will see how interpersonal and team working skills can help build relationships with users, facilitate meetings, influence users in requirements definition, and help them participate as effective members of a systems development team.

**Fundamentals of Programming**
This module teaches programming fundamentals, including data types and variables, statements and compound statements, expressions, selection and repetition, simple computation, and use of libraries. Other key topics include the development of test cases and test plans, and providing suitable programme documentation, with Java programming language used to illustrate programming concepts. Students will also learn how to apply problem-solving skills and get ample practice in expressing solutions using Java.

**Digital Devices & Networking Technology**
This module focuses on the fundamental concepts of digital devices such as computers and mobile phones, as well as networking. It covers the basic architecture, characteristics and functions of a computer system. The module also provides an overview of current day networking system. Major networking components such as switches, hubs and transmission mediums including wireless networks are discussed.
Business Statistics
This module explores how business problems can be solved by applying statistical principles. The main emphasis is to provide students with some basic mathematical skills to handle numerical information in a business context, such as presenting and interpreting statistical data by using means, measures of dispersion and graphs. Topics covered include fundamentals of statistics and probability, discrete and continuous probability distributions, estimation, and correlation.

Accounting
This module covers the basic theory and concepts behind the principles of accounting. It introduces students to the accounting process and the different accounting documents used in typical organisations. Students will learn how to analyse business transactions and financial documents. They will also pick up a basic understanding of the control and accounting for cash, inventories and fixed assets, goods and service taxes, and partnership.

LEVEL 1.2

Object-Oriented Programming
This module builds on the knowledge and skills acquired in the Fundamentals of Programming module. It aims to provide opportunities for students to develop medium-scale applications based on the Object-Oriented (OO) approach. Topics covered include Abstract Data Types (ADTs), the implementation of selected ADTs using the OO approach, and suitable sorting and search algorithms. Software robustness and correctness, and good programming practices will be emphasised.

Enterprise Information Systems
This module aims to provide students with an understanding of the use of Enterprise Information Systems to meet the needs of a typical organisation. Students will learn how Enterprise Information Systems can help an organisation gain a competitive advantage over its competitors, and how the transformation of an organisation can lead to changes in its IT systems.

Enterprise Systems Analysis & Design
This module introduces the Software Development Life Cycle (SDLC) from project planning to implementation with an emphasis on analysis and design. It uses an object-oriented approach to document business needs and design a solution system. Students will learn to understand, document and define the business needs and processing requirements of a new system. They will learn how to design solution systems based on the requirements defined and decisions obtained during analysis.

LEVEL 2.1

Databases
This module examines the fundamental principles and concepts of database systems needed to store and structure an organisation’s information and drive its business functions. Students will learn to analyse data and perform data modelling and normalisation, so as to design effective databases using relevant theories and concepts of relational database systems.

LEVEL 2.2

Developing Web Applications
This module arms students with the knowledge and skills needed to develop Web applications. Students will learn to use the latest Web technologies such as Microsoft’s .NET framework to develop effective Web applications. Students will acquire the technical skills of serverside programming to create Web-based forms, perform state management, access data, and validate user input.

Enterprise Business Processes
This module introduces students to the structure of an organisation and relates it to the job responsibilities of each department. The associated business process - from sales, purchasing and inventory management to finance - will be discussed. Students will learn about the flow of information within an organisation and the tight linkages between departments in an organisation. Students will get a chance to be involved in business process modelling to reinforce their understanding of the different roles played by an organisation’s employees.

LEVEL 3.1

The modules in Levels 3.1 & 3.2 are offered on an interchangeable basis.

PRESCRIBED ELECTIVES

Economics
This module incorporates the study of demand and supply, resource allocation, consumer behaviour, market demand, production and cost theory, price and output of firms under conditions of perfect and imperfect competition. At the end of the module, students will be able to relate the basic concepts and principles of economics to problems and issues.

Financial Markets & Services
The module examines the role of the financial markets and its players as well as the influence of the major financial institutions on the economy and status of Singapore as a financial centre. Students will also trace the relationship between the economy and the institutions in the Singapore economy and the international arena, with emphasis given to current events.
Financial Management
This module provides students with the basic knowledge of financial management. Students will understand the financial environment and the role of finance in business. Students will learn basic concepts like the financial objectives of firms, cash planning and cash budgeting, working capital management, the management of current assets, capital budgeting decisions using discounting techniques, and the sources of short-term and long-term funds.

Financial Planning
This module provides an understanding of personal financial planning and financial products provided by the financial services industry. The module will equip students with technical and conceptual knowledge in financial planning.

Investments
This module introduces the principles and practice of investment. Students will be taught the characteristics of equity securities, fixed income securities, and derivative securities. Topics include valuation analysis techniques and the Singapore equity market, with a focus on the stock exchange, participants, trading system and settlement procedures.

Banking And Financial Applications
The module discusses the various financial applications – such as payment solutions and securities management – that are used in a typical banking and financial organisation. It describes the basic needs of the banking and financial industry and how these applications can help their day-to-day operation and be used for analysis.

IT Outsourcing
This module provides students with an understanding of the need for IT outsourcing. It also discusses ways to manage outsourcing partners and the associated legal requirements to protect intellectual property rights. The module will also explore the role and responsibilities of an outsourcing partner.

Principles of Marketing
This module presents basic concepts and principles in the marketing of goods and services. Students will learn how products and services are planned, priced, promoted and distributed, and will gain an understanding of the interaction of marketing variables and their impact on marketing decisions.

Customer Relationship Management
This module provides students with a knowledge and understanding of Customer Relationship Management and how it benefits organisations. Students will also learn about the different uses of CRM in organisations, various CRM strategies and how to manage customer information to protect the privacy of their data.

LEVEL 3.2
The modules in Levels 3.1 & 3.2 are offered on an interchangeable basis.

Internship
This module provides students with the opportunity to apply the knowledge and skills gained to develop an IT solution to solve a practical problem. Students may undertake a real-life IT project in an organisation that may include problem definition, requirements analysis, design, development and testing, and delivery and presentation of the solution. Through the project, they will learn to appreciate the finer points of project planning and control issues relating to IT project development.

ELECTIVES

Business Intelligence
This module aims to introduce students to the importance and uses of a data warehouse. Students will be taught analytical techniques and concepts which will equip them with the technical know-how to generate useful reports required by businesses for both analytical and operational usage. They will learn how business managers and analysts throughout an organisation make better decisions using complicated analysis, data mining, prediction and forecasting.

Systems Security
This module studies the concepts, techniques, issues and pitfalls of systems security. Students will learn how these techniques may be incorporated within an organisation’s plan and policy on security management, and will be exposed to security technologies in order to gain a better understanding of security controls. Students will also be expected to identify security gaps, and select appropriate techniques to address them.

Wireless Technology
This module equips students with a fundamental understanding of wireless communication and networking, including the architecture and technology underlying the different types of wireless networks and applications. Some technology standards such as IEEE802.11, Bluetooth and Wireless Application Protocol (WAP) will also be covered. Students will learn to determine which technology is best suited for a particular application to achieve optimal performance.

eCommerce Applications Development
This module equips students with technical skills as well as an appreciation of the business perspective in electronic commerce (eCommerce). Topics covered include the building blocks and enabling technologies, the processes of eCommerce transactions, and some business issues in eCommerce.
Information technology has revolutionised the way people live and the way businesses function. It forms the infrastructure of the new economy, and has transformed how business is done by introducing innovation and enhancing efficiency. The Diploma in Information Technology (IT) empowers students to become IT professionals, equipping them with problem-solving skills, knowledge of business functions as well as technical skills to harness the power of information and Internet technologies in the digital economy.

This course provides a strong foundation for the development of robust application systems for all types of businesses and industries. Core modules focus on the fundamental knowledge and skills required of IT professionals, including web applications, information systems, software development, computer architecture, data communication and network systems, computing mathematics and communication skills.

In the course of study, students will have the opportunity to develop their competence in integrating various IT technologies with effective IT solutions and applications to solve business problems.

Integrated into the curriculum are electives and Interdisciplinary Studies (IS) modules that enable students to widen and deepen their spectrum of knowledge beyond the core modules. Their perspectives are broadened and an innovative and enterprising spirit is nurtured. This is important for IT professionals working in a complex business environment where problems are multi-faceted in nature and require knowledge and skills in different disciplines.

In their final year, students will build upon this solid foundation and specialise in niche areas such as software development, networking and security, mobile business application, infocomm sales & marketing and more. To strengthen their work experience, students will have to undertake an Internship in their final year in a relevant industry.

Students are required to own notebook computers.

**ENTRY REQUIREMENTS**

To be eligible for consideration, candidates must have the following GCE ‘O’ Level examination (or equivalent) results and fulfill the aggregate computation requirements:

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* Candidates must attain the required grade for English as a first language.

Candidates with severe vision deficiency should not apply for the course.
CAREER PROSPECTS

Singapore has a vibrant IT industry with many international IT companies based here. IT graduates can join the industry as IT professionals who are able to choose from a wide variety of jobs regardless of their specialisation.

The specialisation options also give graduates a head-start in key niche areas such as Business Management, Infocomm Sales and Marketing, Mobile Business Application and Software Development.

Graduates will find themselves well-equipped for roles as programmers, application developers and administrators for network systems and the web. They can also become business solutions analysts and designers, software engineers, java specialists, enterprise software developers, mobile business application developers, system engineers, and infocomm sales and marketing professionals.

ACCREDITATION FOR FURTHER STUDIES

The Diploma in Information Technology is an internationally recognised qualification. Graduates enjoy advanced standing at many local and overseas universities.

In addition, they gain module exemptions in one or more modules with infocomm-related degree programmes at local universities:

- **National University of Singapore**
  Bachelor of Computing (Hons) in Computer Engineering, Information Systems, Computing, Computer Science or Electronic Commerce
- **Nanyang Technological University**
  Bachelor of Science (Hons) in Computer Engineering or Computer Science
- **Singapore Management University**
  Bachelor of Science in Information Systems Management

COURSE CURRICULUM

<table>
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<tr>
<th>Module Name</th>
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<tr>
<td>Computing in Society</td>
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<td>Computers &amp; Operating Systems</td>
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<td>Fundamentals of Programming</td>
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<td>Computing Mathematics</td>
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<td>Creativity &amp; Applied Thinking Skills^</td>
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<td>Communication Toolkit^</td>
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<td><strong>YEAR 2</strong></td>
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<tr>
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<td>Project Management</td>
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<tr>
<td>Prescribed/Elective Module^#</td>
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<tr>
<td>Innovation &amp; Enterprise in Action^</td>
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<tr>
<td>World Issues: A Singapore Perspective^</td>
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<td><strong>Level 3.2 (25 hours per week)</strong></td>
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<tr>
<td>Internship</td>
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</tbody>
</table>

Notes:

* In the second year, students may choose to major in an option. Each option requires the completion of five prescribed modules. You will also take three elective modules and undergo an internship in your final year.

**Business Option**

- Principles of Marketing
- Enterprise Business Processes
- Infocomm Sales & Marketing Strategies
- Infocomm Sales Life Cycle Management
- Customer Decision Making & Negotiation Skills
- Infocomm Business Case Challenge
- Economics
- Organisational Behaviour

**Business Management Option**

- Principles of Marketing
- eBusiness Foundations
- Accounting
- Supply Chain Management
- Web Database Development
- eCommerce Applications Development
- Economics
- Organisational Behaviour

**Solutions Architect Option**

- Data Structures and Algorithms
- Advanced Object-Oriented Analysis & Design
- Enterprise Applications Development
- Windows Applications Development
- Local Area Networks
- Wireless Technology
- Systems Security
- C++ Programming

**Information Security & Forensics**

- Information Security
- Malware Analysis & AntiVirus Technologies
- Hacking & Digital Forensics

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**COURSE MODULES**

**LEVEL 1.1**

**Fundamentals for IT Professionals**
This module gives a broad introduction to the field of IT by exploring the roles, professional practice, ethical expectations and development paths of IT professionals. Students will appreciate the importance of problem solving skills in providing effective IT solutions. They will see how interpersonal and team working skills can help build relationships with users, facilitate meetings, influence users in requirements definition, and help them participate as effective members of a systems development team.

**Computing in Society**
This module will expose students to the latest in new media and web technologies. Students will practice thinking and problem-solving skills as well as pick up infocomm professionalism and soft skills to ascertain how they can leverage on such technologies to the advantage of an organisation while avoiding the pitfalls that these can bring. They are required to work on case illustrations and will learn and analyse the social, ethical and professional issues of computing.

**Computers & Operating Systems**
This module surveys the basic architecture and functions of a computer system, including input/output devices, data representation, file permissions and operating systems. Students will get hands-on experience in using system commands and writing simple shell code to tailor the system environment to the needs of software application development.

**Fundamentals of Programming**
This module teaches programming fundamentals, including data types and variables, statements and compound statements, expressions, selection and repetition, simple computation, and use of libraries. Other key topics include the development of test cases and test plans, and providing suitable programme documentation, with Java programming language used to illustrate programming concepts. Students will also learn how to apply problem-solving skills and get ample practice in expressing solutions using Java.

**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.

**NETWORKING FUNDAMENTALS**
This module provides an overview of networking. Key topics covered include layering, protocol stacks, network topologies, the Open Systems Interconnection (OSI) model, Transmission Control Protocol/Internet Protocol (TCP/IP), complex data networks and commonly used network systems such as Ethernet and Token Ring. An overview of Internetworking and telecommunications will also be presented to give students a global picture of how the connections of homogenous and heterogeneous networks are established in the real world.

**Object-Oriented Programming**
This module builds on the knowledge and skills acquired in the Fundamentals of Programming module. It aims to provide opportunities for students to develop medium-scale applications based on the Object-Oriented (OO) approach. Topics covered include Abstract Data Types (ADTs), the implementation of selected ADTs using the OO approach, and suitable sorting and search algorithms. Software robustness and correctness, as well as good programming practices will be emphasised.

**User Interface Design**
This module covers the theory and practical aspects of designing effective user interfaces by taking students through the design process, with special focus on the human-computer interaction. Students will learn how to apply good design principles and techniques to create desktop graphical interfaces as well as Web interfaces for different devices. The module encourages students to think through the different aspects of human-computer interaction design, including information architecture, content structure, site structure, navigation, interaction and usability.

**Enterprise Information Systems**
This module aims to provide students with an understanding of the use of Enterprise Information Systems to meet the needs of a typical organisation. Students will learn how Enterprise Information Systems can help an organisation gain a competitive advantage over its competitors, and how the transformation of an organisation can lead to changes in its IT systems.

**LEVEL 2.1**

**Databases**
This module examines the fundamental principles and concepts of database systems needed to store and structure an organisation’s information and drive its business functions. Students will learn to analyse data and perform data modelling and normalisation, so as to design effective databases using relevant theories and concepts of relational database systems.
Object-Oriented Analysis & Design
Developing software systems requires a firm understanding of the Software Development Life Cycle (SDLC). This module leverages off the skills acquired in Object-Oriented Programming to introduce software design and the requirements analysis, so that students can experience the full cycle of software development. They will be given an overview of various SDLTs as well as be provided with an in-depth look at software development methodology. In particular, students will learn about gathering techniques and the primary artefacts of system design. They will be able to specify, design and document simple software systems using appropriate modelling tools.

Developing Web Applications
This module arms students with the knowledge and skills needed to develop Web applications. Students will learn to use the latest Web technologies such as Microsoft’s .NET framework to develop effective Web applications. Students will acquire the technical skills of server-side programming to create Web-based forms, perform state management, access data, and validate user input.

LEVEL 2.2
Project Management
Managing the development and construction of any information system is a complex task. In this module, students will learn how to plan and control the various phases in the life cycle of an information systems project. In particular, they will learn to establish project terms of reference and develop preliminary plans to facilitate the execution, monitoring and control of projects. The professional code of conduct and practice issues will be discussed. This module also prepares students to conduct and manage their final-year project in a professional way.

LEVEL 3.1
The modules in Levels 3.1 & 3.2 are offered on an interchangeable basis.

PRESERVED/MODULES

BUSINESS OPTION
Infocomm Sales & Marketing

Principles of Marketing
This module presents basic concepts and principles in the marketing of goods and services. Students will learn how products and services are planned, priced, promoted and distributed, and will gain an understanding of the interaction of marketing variables and their impact on marketing decisions.

Enterprise Business Processes
This module introduces students to the structure of an organisation and relates it to the job responsibilities of each department. The associated business process - from sales, purchasing and inventory management to finance - will be discussed. Students will learn about the flow of information within an organisation and the tight linkages between departments in an organisation. Students will get a chance to be involved in business process modelling to reinforce their understanding of the different roles played by an organisation’s employees.

Infocomm Sales & Marketing Strategies
This module will introduce students to the concept of market segmentation and the development of sales and marketing strategies for each segment. They will acquire an understanding of industries segmentation and customer segmentation from corporate, small and medium businesses to consumers. They will also delve into the different go-to-market strategies and selling techniques required in the context of ICT (such as consultative selling, major account selling and management, territory selling and management, partner management and consumer marketing).

Infocomm Sales Life Cycle Management
This module introduces students to a customer’s ICT purchase decision making process and sales life cycle management. Students will also pick up some fundamental concepts in interpreting customer annual reports, financial ratios, industry analysis and competitive strategies so that they can recognise customer needs and wants. They will follow the sales life cycle from prospecting, qualifying, developing solutions, negotiating and closing the sales to post-sale support and services, up-selling and cross-selling.

Customer Decision Making & Negotiation Skills
Students will be introduced to soft skills in understanding customer biases and concerns, building rapport, handling objections, identifying informal and formal decision makers, selling functions/features/benefits, negotiating and closing sales techniques. They will also learn about reference selling and proof of concept as well as pick up presentation and communication skills. The module offers opportunities to role play and develop value proposition in sales calls within the context of ICT.

Infocomm Business Case Challenge
This module introduces groups of students to a case study competition where they would need to build a business solution specific to a client’s business challenges and ICT requirements. Students will pick up the tools and techniques needed to qualify the opportunity, assign team members to develop technical and business proposals, prepare a solution to the case study, and finally present it to a panel of ICT industry experts.

Economics
This module incorporates the study of demand and supply, resource allocation, consumer behaviour, market demand, production and cost theory, price and output of firms under conditions of perfect and imperfect competition. At the end of the module, students will be able to relate the basic concepts and principles of economics to problems and issues.

Organisational Behaviour
This module provides insights into the factors that influence individual and group behaviour in an organisation. Students will learn how to use these concepts to improve interpersonal and group interaction skills.

BUSINESS OPTION
Business Management

eBusiness Foundations
In the New Economy, electronic commerce offers functionality and new ways of doing business that no company can afford to ignore. This module provides an understanding of the framework in which eBusinesses operate to help students
in their analysis, design and development of eBusiness solutions. Case studies and business examples complement conceptual coverage to provide a real-world context of both successful and unsuccessful implementations of eBusiness.

Accounting
This module covers the basic theory and concepts behind the principles of accounting. It introduces students to the accounting process and the different accounting documents used in typical organisations. Students will learn how to analyse business transactions and financial documents. They will also pick up a basic understanding of the control and accounting for cash, inventories and fixed assets, goods and service taxes, and partnership.

Supply Chain Management
This module introduces the concept of a supply chain and its importance in strategic management. It provides students with an understanding of key processes in managing eBusiness transactions and the use of information technology for effective supply chain management.

Web Database Development
This module builds upon the Databases and eCommerce Application Development modules to expand students’ knowledge and skills at developing a Web database for eCommerce applications. The module explores database tools and techniques used in the development of Internet-based transaction systems that require concurrent access to multi-user databases for data and information. Students will also learn the concept of database concurrency and integrity in the context of a web database for eCommerce.

eCommerce Application Development
This module equips students with technical skills as well as an appreciation of the business perspective in electronic commerce (eCommerce). Topics covered include the building blocks and enabling technologies, the processes of eCommerce transactions, and some business issues in eCommerce.

**TECHNOLOGY OPTION**

**Mobile Business Application**

Mobile Business Application
This module explores the world of mobile business applications. It gives an understanding of how mobile applications are not just for the consumer, but can also help a business to grow.

Mobile Application Development
This module focuses on the design and development of applications for mobile devices like hand phones, personal digital assistants (PDAs) and handheld computers. Due to the nature of these handheld devices, issues such as memory storage, user interface and data input methods require more careful consideration and planning. At the end of this module, students will be able to develop applications that can run on mobile devices and interact wirelessly with server-side programmes.

Advanced Mobile Applications Development
This module builds upon the skills and knowledge that students have acquired from the Mobile Applications Development module. It will focus on the development of advanced applications and emerging mobile operating systems. For example, students could develop applications for industries such as entertainment, games and healthcare. They will learn to develop applications for emerging operating systems such as the iPhone OS and Android.

Wireless Technology
This module equips students with a fundamental understanding of wireless communication and networking, including the architecture and technology underlying the different types of wireless networks and applications. Some technology standards such as IEEE802.11, Bluetooth and Wireless Application Protocol (WAP) will also be covered. Students will learn to determine which technology is best suited for a particular application to achieve optimal performance.

Mobile & Wireless Security
This module examines the concepts, techniques, issues and pitfalls relating to mobile and wireless security, including how these techniques may be implemented within an organisation’s plan and policy on security management. Students will be exposed to wireless security technologies in order to gain a better understanding of security controls, and will eventually be able to apply this knowledge to make their applications more secure.

Advanced Object-oriented Analysis & Design
This module leverages off the core analysis and design skills acquired in the Object-oriented Analysis & Design module to introduce complex design artefacts, relevant methodologies and the analysis techniques needed to model and document complex software systems. Students will also learn to appreciate the design, deployment and management of complex software systems in relation to the best practices that the industry recommends.

**TECHNOLOGY OPTION**

**Solutions Architect**

Data Structures & Algorithms
This module aids students in further developing their programming skills. They will be expected to analyse, design, implement, test and document programmes involving various data structures. Topics covered include data structures such as arrays, lists, stacks, queues, trees and their associated algorithms within the conceptual framework of abstract data types. The module will make use of the class feature of Java language for the concrete implementation of various abstract data types.

Enterprise Application Development
This module helps students to develop the tools and techniques necessary to undertake the development of enterprise applications based on sound software engineering principles. The module covers the Java Project Life Cycle and introduces the necessary framework to develop enterprise applications. Topics include Java security, electronic commerce, Enterprise JavaBeans (EJB), Extensible Markup Language (XML) and JavaServer Pages (JSP). Students will then undertake, with guidance, a sophisticated real-world enterprise application based on the three-tier architecture model.

Windows Application Development
Building upon the Java programming modules, this module introduces additional concepts such as advanced user interface, multi-threading, streams and networking programming. Students will then develop medium to large-scale applications using Java. Appropriate tools and standards, and additional data structures and algorithms will be introduced.
Local Area Networks
The typical computer network of an organisation has to support heterogeneous, client-server computing to facilitate dissemination of information and sharing of resources. This module covers basic LAN structure, including types of physical cables used, how these cables are used for LAN connections and how hardware platforms (such as servers and workstations) are attached to LANs. The module also introduces students to the major network operating systems and applications that run on LANs.

Systems Security
This module studies the concepts, techniques, issues and pitfalls of systems security. Students will learn how these techniques may be incorporated within an organisation’s plan and policy on security management, and will be exposed to security technologies in order to gain a better understanding of security controls. Students will also be expected to identify security gaps, and select appropriate techniques to address them.

C++ Programming
This module gives an overview of the syntax of C++ required for object oriented programming. Students will learn how to implement classes, inheritance, polymorphism and multiple inheritances in C++. An overview of the memory management model of C++ is covered as well as basic i/o operations such as file i/o and standard i/o. The module also covers standard templates such as linked lists, trees and other abstract data types to enable the students to develop large scale C++ programs.

GAMES DESIGN & DEVELOPMENT

Game Design
The module adopts a “playcentric” approach to game design by understanding and designing for that player experience, regardless of platform. It explores innovation in design for an emotionally appealing gaming experience. Students learn what a game is, how it works, and what makes it compelling to play. The exercise focused module will take students through conceptualising a game, prototyping it, conducting playtest, tuning and balancing to refine the game’s design. Students will learn to make use of a game engine as a prototyping tool and a game design document to outline their game concept.

Games Programming
This module provides the techniques and skills for building games on a PC and console. It studies how to create 2D games from using sprite batches to creating sophisticated 3D games looking at how to create, load, texture 3D objects, providing special effects for explosions, transition, and a 3D particle system. Workings of important tasks such as adding input, sound, music, creating game components and services, physics and artificial intelligence, basic and advanced High Level Shader Language (HLSL) techniques, and performance tuning techniques will be covered. Students will experience the creation of complete games and many demos along the way.

INFORMATION SECURITY & FORENSICS

Information Security
This module provides an overview of the various domains of Information security. It aims to provide an appreciation of the Information security from an end-to-end perspective. This module covers security across the seven layers of InfoComm – organisation, people, physical access, system, application, network and data. This module takes a comprehensive and practical approach towards studying information security in its entirety.

Malware Analysis & Antivirus Technologies
This module provides a practical approach to various techniques in analysing malwares and understanding the technologies involved in creating anti-virus software. Students will learn behavioral analysis and code analysis techniques for diagnosing malwares. Students will have hands-on practice on using tools such as system monitoring utilities, disassemblers and debuggers. Antivirus technologies such as heuristics detection engine and virus signature creation will also be taught.

Hacking & Digital Forensics
This module provides a practical approach to various techniques in scanning, testing, hacking and securing systems. Students will learn the techniques intruders used to hack a system, and the steps to secure it. Students will also learn about intrusion detection, policy creation, social engineering, DDos attacks, and buffer overflow.

This module also gives an insight to the process of forensics investigation. It covers the various types of computer-related crimes, techniques of gathering electronic evidence, and recovering of deleted, damaged or encrypted data. Students will also make use of advance forensic tools to perform forensic investigation.

ELECTIVES

Additional Mathematics 1
This module, together with the succeeding module, Additional Mathematics 2, will enhance a student’s competency in Mathematics. The combination of the two modules will provide the pre-requisite mathematical foundation and knowledge required by more advanced elective modules such as Calculus & Numerical Methods and Advanced Statistics & Pure Mathematics. The main focus in this module is to solve quantitative problems in algebra and co-ordinate geometry at GCE ‘O’ Level Additional Mathematics standard.

Additional Mathematics 2
The main emphasis in this module is to develop a student’s ability to solve quantitative problems in trigonometry and calculus at GCE ‘O’ Level Additional Mathematics standard. Topics include circular measurements, trigonometric functions, simple trigonometric identities and equations, the solving of trigonometric equations using additional formulae, vectors and scalars, differentiation and its applications, higher derivatives, integration and its applications, and parametric equations.
Advanced Statistics & Pure Mathematics
For students who intend to pursue further studies in computing, this module will provide a good foundation in Mathematics. Together with the Calculus & Numerical Methods module, this module will provide students with a mathematical foundation comparable to GCE ‘A’ Level Mathematics. Students will be able to solve more complex mathematical problems in statistics and pure mathematics. Topics include complex numbers, vectors in two and three dimensions, and statistics.

Calculus & Numerical Methods
Like the Advanced Statistics and Pure Mathematics module, this module is designed to provide a mathematical foundation comparable to GCE ‘A’ Level Mathematics. The main emphasis is placed on enabling students to solve quantitative problems using calculus and numerical methods. Topics include differentiation, integration and the solving of equations using the Newton-Raphson method.

Client-Server Programming
Building upon the knowledge and skills acquired in Java programming modules, this module focuses on the underlying concepts of clientserver development using commonly deployed databases. The module aims to introduce the building of distributed systems using Remote Method Invocation (RMI) and Java Database Connectivity (JDBC). Students will be expected to develop client-server applications based on the two-tier model.

C Programming
This module covers the constructs and idioms of the C programming language. Examples will be drawn from application domains where C’s strengths are exploited. The module will also expose students to the "pointer-based" implementation of various data structures.

Developing Office Applications
Having basic skills in the use of office automation tools is important to any knowledge worker. This module will teach students to design and create dynamic Web pages that contain information residing in various office application suites, such as spreadsheets and databases. Students will learn to analyse, design and implement integrated solutions based on typical business scenarios in an office environment. As this module is targeted at application developers, students may be expected to write programming code to integrate the various office applications.

Discrete Mathematics
This module aids students in developing the basic skills and understanding of the mathematical principles and techniques required in computing. The notations and concepts taught will enable them to translate actual problems into abstractions, formulate formal descriptions, and reason about their properties in a rigorous way. Topics include set theory, logic, relations, functions, recursion and recursive algorithms, and graph theory.

Internet Computing
In this module, students will develop client/server-based distributed applications using techniques such as Common Gateway Interface (CGI) and applets. They will address the issues of designing and implementing such applications with database accesses using programming languages such as C, Perl and Java. This module requires knowledge of computer networking, Java programming and databases.

Inventory Management
This module introduces techniques used for maintaining minimum stocks of various industries and commercial enterprises at minimum cost. Special emphasis is given to areas within the supply chain where cost of operations could be minimised through efficient management of inventory. An analysis of different inventory policies and the use of basic techniques in forecasting and simulation relevant for inventory management are also included.

Mobile Operating Systems
This module surveys the various mobile operating systems (OS) in the market, with a focus on the fundamentals of mobile OS and how they differ from those of conventional desktop OS. The module will also touch on some mobile development platforms. Students will learn to explain the characteristics and functions of the operating systems, which will be useful when they start developing mobile applications using the various platforms available.

Principles of Management
This module gives students an understanding of basic management principles and practices. Students will learn how managers plan, lead, organise and control activities and resources in organisations, as well as how change management, innovation and creativity enhance organisational performance.

Professional Issues
This module addresses social, legal and ethical issues faced by IT professionals. Students will learn critical thinking skills that will help them deal with ethical dilemmas likely to arise in working life. Through storytelling, case studies and workshops, students will discover value systems and how these influence moral decisions.

Programming Wireless Applications
This module highlights the development of applications for small devices such as smart cards, personal digital assistants (PDAs), mobile phones and pagers, all the way up to the set-top box. Students will acquire knowledge and hands-on experience in the client- and server-side Java software development of wireless applications. An emphasis is placed on converting concepts into software practice, with reinforcement by the development of a small client-server wireless application.

Research Studies
This module gives students an opportunity to research and present a topic on IT and its applications. Each student will be assigned a supervisor well versed in the selected topic of research and will undertake research work in consultation with the supervisor. At the end of the research period, the student will submit a report and present his findings to fellow students.

Technopreneurship
The rapid emergence of new infoocom technologies is throwing up new capabilities as well as opportunities for creativity and entrepreneurship. This module focuses on the processes and mechanisms by which new ideas and inventions can be commercialized in the market. Students will examine case studies of real-world examples of technopreneurship. They will also learn about the issues and challenges of transforming a technological innovation into a successful product or service in the market place.
Web Development & Administration
The module provides students with an understanding of the concepts and techniques behind developing typical web-based applications such as a Content Management System (CMS). Students will gain hands-on experience developing these sort of applications, primarily using open source web development tools. They will also be equipped with the skills needed to administrate and maintain for web servers.

Web Server Administration & Security
This module equips students with the skills needed to plan, install and maintain websites and web servers. It will discuss issues such as Internet organisation and administration, website security, and server performance. Students will also cover Internet naming and addressing, website planning, web server installation and configuration, and website security.

Wide Area Networks
This module gives a broad overview of the wide area networking industry as well as details of various telecommunications and data networking topics. Introducing telecommunications concepts (point-to-point, multi-point and packet switch services) and components used to build wide area networks (WANs), this module also covers the protocols used to transport voice and data over wide areas. These include the Integrated Services Digital Network (ISDN), frame relay, Asynchronous Transfer Mode (ATM), and synchronous optical networking (SONET).

Windows Programming using Visual C++
This module equips students with the knowledge and skills needed to develop Windows applications and components using Visual C++. Additional language constructs, libraries and tools will be introduced. This module also covers basic concepts and principles in the marketing of goods and services. Students will learn how products and services are planned, priced, promoted and distributed, and will gain an understanding of the interaction of marketing variables and their impact on marketing decisions. Having adopted an object-oriented approach in the earlier modules, students will gain an understanding of the new modular software architecture – Component Object Model (COM).

LEVEL 3.2
The modules in Levels 3.1 & 3.2 are offered on an interchangeable basis.

Internship
This module provides students with the opportunity to apply the knowledge and skills gained to develop an IT solution to solve a practical problem. Students may undertake a real-life IT project in an organization that may include problem definition, requirements analysis, design, development and testing, delivery and presentation of the solution. Through the project, they will learn to appreciate the finer points of project planning and control issues relating to IT project development.
The Diploma in Multimedia & Animation (MMA) is a practice-oriented Interactive Digital Media course that provides students with strong art and design fundamentals in the first year and focused discipline-specific core skills in the second year to develop their competencies either in digital animation production or interactive experiences creation.

Students can opt to specialise in Digital Animation or Interactive Media and are given opportunities to develop their creative thinking, problem solving and communications skills. Through a year-long production project in the third year, students will acquire discipline-specific expertise and develop the spirit of innovation and enterprise.

Integrated into the curriculum are elective and Interdisciplinary Studies (IS) modules that enable students to widen and deepen their spectrum of knowledge beyond the core modules. This is important for interactive and digital media professionals working in an environment where problems are multi-faceted in nature, thus requiring knowledge and skills in different disciplines.

Students are required to own MacBooks.

**ENTRY REQUIREMENTS**

To be eligible for consideration, candidates must have the following GCE ‘O’ Level examination (or equivalent) results and fulfill the aggregate computation requirements:

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<thead>
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<th>Subject</th>
<th>‘O’ Level Grade</th>
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<tbody>
<tr>
<td>English Language*</td>
<td>1-7</td>
</tr>
<tr>
<td>Mathematics (Elementary/Additional)</td>
<td>1-6</td>
</tr>
<tr>
<td>Any two other subjects</td>
<td>1-6</td>
</tr>
</tbody>
</table>

The aggregate computation for selection is based on grades obtained for English, Mathematics, Science (Grade 1-9) or Design & Technology (Grade 1-9) or Food & Nutrition (Grade 1-9) or a relevant OSIE / Applied Subject (Grade 1-9) and two other subjects.

* Candidates must attain the required grade for English as a first language.

Candidates with hearing deficiency or severe vision deficiency should not apply for the course.

Those with colour appreciation deficiency may be considered, subject to an in-house test.

**CAREER PROSPECTS**

MMA graduates are trained to be Interactive or Digital Media Professionals capable of developing media-rich applications and content such as 2D and 3D animation, 3D models, edutainment and rich media applications. Graduates can look forward to exciting careers as 2D or 3D animators, 3D modellers, visual interface designers or interactive experience designers and developers.
ACCREDITATION FOR FURTHER STUDIES

The Diploma in Multimedia & Animation is recognised by both local and overseas universities, which offer advanced standing to our graduates.

With the Diploma in MMA, graduates can pursue further studies in the creative field with universities such as:

- **National University of Singapore**  
  Bachelor of Arts in Communications & New Media
- **Nanyang Technological University**  
  Bachelor of Fine Arts in Art, Design and Media
- **James Cook University (Australia)**  
  Bachelor of New Media Arts
- **Royal Melbourne Institute of Technology (Australia)**  
  Bachelor of Arts in Animation & Interactive Media, Multimedia or Games Graphics Design
- **Digipen Institute of Technology (USA)**  
  Bachelor of Fine Arts in Production Animation
- **Sheridan College (Canada)**  
  Bachelor of Applied Arts in Animation

COURSE CURRICULUM

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Credit Units</th>
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<tr>
<td><strong>YEAR 1</strong></td>
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<td>2D Design</td>
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<tr>
<td>Digital Photography</td>
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<tr>
<td>Fundamentals for Creative Professionals</td>
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<tr>
<td>Principles of Programming</td>
<td>5</td>
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<tr>
<td>Creativity &amp; Applied Thinking Skills^</td>
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<tr>
<td>Sports &amp; Wellness^</td>
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<td><strong>Level 1.2 (24 hours per week)</strong></td>
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<td>3D Design</td>
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<td>Perspective Drawing</td>
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<td>Digital Audio &amp; Video</td>
<td>5</td>
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<td>Animation Principles</td>
<td>5</td>
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<td>Communication Toolkit^</td>
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<td><strong>YEAR 2</strong></td>
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<td><strong>Level 2.1 (24 hours per week)</strong></td>
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<td><strong>Specialisation Option: Digital Animation</strong></td>
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<td>Figure Drawing</td>
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<td>Principles of Body Mechanics</td>
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<td>3D Modelling &amp; Animation</td>
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<td><strong>Level 2.2 (24 hours per week)</strong></td>
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<tr>
<td><strong>Specialisation Option: Digital Animation</strong></td>
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<td>Drawing for Animation</td>
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<td>Acting for Animation</td>
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<tr>
<td>Advanced Modelling &amp; Rigging</td>
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<tr>
<td>Digital Cinematography</td>
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<tr>
<td>Innovation &amp; Enterprise in Action^</td>
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<tr>
<td><strong>Specialisation Option: Interactive Media</strong></td>
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<tr>
<td>Digital Design for Interactivity</td>
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<tr>
<td>Sound Design for Interactive Media</td>
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<tr>
<td>Authoring Interactive Experience II</td>
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<tr>
<td>Developing Rich Media Applications</td>
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<td>Innovation &amp; Enterprise in Action^</td>
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<td><strong>Level 3.1 (24 hours per week)</strong></td>
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<td>Global Production &amp; Project Management</td>
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<td>Concept Development</td>
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<td>Portfolio Development</td>
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<td>World Issues: A Singapore Perspective^</td>
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<td>Interdisciplinary Studies (IS) module</td>
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<td><strong>Specialisation Option: Digital Animation</strong></td>
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<tr>
<td>Digital Audio Design</td>
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<td><strong>Specialisation Option: Interactive Media</strong></td>
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<td>Digital Effects</td>
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<td><strong>Level 3.2 (25 hours per week)</strong></td>
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<tr>
<td>Internship</td>
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Notes:

^ For more details on Interdisciplinary Studies (IS) modules, please log on to www.np.edu.sg/is/. You will also take three elective modules and undergo an internship project in your final year.

IS Modules

The School of Interdisciplinary Studies (IS) delivers the interdisciplinary curriculum under the Ngee Ann Learning Model (NLM). The NLM was introduced in 2001 to nurture a new generation of professionals with multidisciplinary skills to meet the challenges of a knowledge-based economy. The NLM incorporates core disciplines and Interdisciplinary Studies. It also nurtures innovative and entrepreneurial traits through the Innovation & Enterprise in Action (I & E in Action) module. IS modules challenge boundaries and offer insights into Communication, Entrepreneurship, Life Skills, Media & the Arts, and Science & Technology.
COURSE MODULES

LEVEL 1.1

2D Design
This module explores the process of organising, displaying and communicating ideas and information creatively through words and images to the minds of the intended audience. It introduces the basic elements and principles of design and covers problem solving, concept development, the creative process and creative brief relevant to visual communication. It also studies colour structure, composition and the ways light modulates human perception of colour and form.

Drawing Fundamentals
This module covers the fundamentals of drawing for production artists and animators. It introduces materials as well as traditional and contemporary drawing techniques from direct observation, and aims to develop students’ ability to perceive and render forms in perspective and space. In addition to covering perceptual and verbal skills, the module emphasises basic professional habits in drawing practice as well as the use of line, value, light and shade, spatial organisation and composition, and linear and atmospheric perspective.

Digital Photography
This module aims to develop a student’s ability to see all things creatively through digital photography. It emphasises on developing their skills in planning, design and composition, visualisation and observation while imparting the technical know-how of digital photography. Students will cover the art and techniques of digital photography, studio photography and digital imaging techniques using photo-editing software.

Fundamentals for Creative Professionals
This module provides students with a broad introduction to the interactive and digital media industry, and the tools of its trade. Students will gain a good understanding of the roles, professional practices, ethical expectations and career development paths within the industry. They will learn about the importance of portfolio and show-reel preparation. The module will also develop their problem solving, researching, concept development, creative visualisation, interpersonal, communication and teamwork skills.

Principles of Programming
This module introduces the software development process and program design principles for multimedia applications. It covers the three programming constructs as well as expressions, selection and repetition, statements and compound statements, data types and variables, basic data structures and algorithms, and project management skills.

LEVEL 1.2

3D Design
This module introduces the materials, techniques, principles and ideas behind three-dimensional design. Both traditional physical medium and digital tools are used to explore line, plane, volume, mass and space as well as build three-dimensional forms that accurately depict measurement and proportion.

LEVEL 2.1

SPECIALISATION OPTION
Digital Animation

Figure Drawing
This module introduces the concepts and techniques of figure drawing. It provides students with a thorough understanding of the structure and anatomy of the human figure, and how the underlying skeletal structure can affect the surface appearance of a body. It also aims to develop a student’s ability to create drawings that communicate the dynamics of body structure and movement.
Principles of Body Mechanics
This module further develops students' classical animation skills on various biped/human characters. They will better understand the concepts of motion and body mechanics. Students will also be able to create convincing movement and convey expression of mood, thought, attitude and personality in an effort to bring their animated characters to life.

3D Modelling & Animation
This module examines the techniques behind creating and animating 3D digital models using a 3D graphic and animation package. It provides an overview of texturing, shading, lighting and rigging.

Scriptwriting, Storyboarding & Storytelling
This module introduces scriptwriting and visual storyboarding techniques for animation and digital media. It explores the nature of storytelling and exposes students to historical traditions of storytelling in all forms with applications ranging from cinema and cartooning treatments to character animation. Students will learn how to tell stories from concept, script and storyboard to the development of a complete technical breakdown of timing and strategies, through which an animated short with sound is realised.

SPECIALISATION OPTION
Interactive Media

Visual Interface Design
This module further develops students’ understanding of light, colour and design in the two-dimensional form. It introduces the creative and visual design process, the design brief as applied to interactive digital media, and key principles and techniques in creating compelling and aesthetically pleasing digital visual interfaces for multiple platforms such as the Internet, mobile devices, CD or DVD. The module also covers information design concepts and human perception principles.

Interactive Narrative
This module introduces scriptwriting and visual storyboarding techniques for interactive digital media. It explores the nature of storytelling and exposes students to the historical traditions of storytelling in all forms. It covers interactive narrative theory and students will learn to translate these narrative concepts to script and create storyboards to express ideas, feelings and drama. They will also learn to develop a complete technical breakdown of timing and strategies that are ready for interactive digital media production.

Authoring Interactive Experience I
This module introduces interactive rich media application design and programming for interactivity through the eyes of animation, visual effects and multimedia designers. The module also covers authoring, digital storytelling techniques, user experience design and project management techniques.

3D Modelling & Animation
This module examines the techniques behind creating and animating 3D digital models using a 3D graphic and animation package. It provides an overview of texturing, shading, lighting and rigging.

SPECIALISATION OPTION
Digital Animation

Drawing for Animation
This module continues to introduce life drawing – human and animal anatomy, architecture and scenery – to further build students’ understanding of human kinetics and structure. It covers solid and contour drawing techniques, gesture drawing, quick sketch and dramatic action.

Acting for Animation
This module further develops students’ ability to translate thoughts and feelings into specific gestures and actions. It surveys the history of acting in theatre, animation and film. The module also focuses on the analysis of action in the human form, gestures, timing, characterisation, communication of attitudes, character relationships, storytelling through motion, emotion and thought processes to create a moving and memorable acting performance.

Advanced Modelling and Rigging
Students will gain an understanding of modelling and rigging right from design to the development and setup of a character pipeline. This module focuses on modelling and rigging the different parts of a character’s body – whether it is a biped, quadruped or humanoid character – as well as covers rig props and facial setups for the characters. It introduces the model’s topology as well as modelling and optimisation techniques for rigging and texturing. The module also covers scripting to help in automating tasks.

Digital Cinematography
This module introduces the art of cinematography for digital video and computer-generated imagery. It covers principles and concepts behind practical cinematography such as physical lighting, the choreography of camera movement, and the lighting of computer-generated environment to enhance visual impact in storytelling.

SPECIALISATION OPTION
Interactive Media

Digital Design for Interactivity
This module aims to develop a student’s strategic, conceptual and creative thinking skills as well as problem solving skills for interactive visual communications. It focuses on interaction design, visual image development and execution. Students will also learn to utilise and work with television, print, digital, guerrilla, outdoor and ambient media, to create engaging and interactive visual communications such as interactive advertisements and animation, edutainment, simulations and advergames.
Sound Design for Interactive Media
This module covers the fundamentals of digital audio and its associated technologies as well as the principles of sound design for the Internet and interactive media. It explores the manipulations of various envelopes on amplitude, filter and modulation as well as the use of low frequency oscillator and noise in designing sound for interactive media. It covers subtractive synthesising, and studies the processing and reactions of sounds in an interactive environment such as audio compression for web and sound programming.

Authoring Interactive Experience II
This module further develops a student’s ability to design and author highly interactive experience applications. It focuses on interactivity authoring through the eyes of animation, visual effects and multimedia designers. Students will also cover advanced authoring, digital storytelling techniques, user experience design and project management techniques.

Developing Rich Media Applications
This module examines various client-server architectural concepts that come with a rich client, an application server and database. Students will develop their ability to program for rich media applications that are connected to a database. They will also learn client- and server-side programming as well as develop rich media applications that are capable of multi-user database connection and access.

LEVEL 3.1

Global Production & Project Management
This module introduces the realities of team-based production environments, project and production management concepts and its best practices. Students will be given a taste of the development process from project initiation, concept and visual development, pitching and presentation to production and management. They will also gain an awareness of the global production nature of an IDM project and appreciate the importance of a cross-cultural project team.

Concept Development
This module introduces various idea generation and concept development techniques. Students learn the pre-production skills of concept illustration and visual development along with the learnt knowledge and skills in storytelling, design and drawing to communicate the concept effectively to an audience.

Portfolio Development
This module provides students with the opportunity, time and space to prepare and consolidate their best works into printed and digital portfolio that can be used for job interviews or further studies. It covers portfolio and show-reel preparation and marketing as well as other related information regarding job interviews, trade shows, professional standards and contract negotiation.

SPECIALISATION OPTION
Digital Animation

Digital Audio Design
This module introduces the basic production techniques behind audio and sound effects, the equipment used and the procedures that will make moving images come alive. It pays particular attention to the role of audio experience, and how sound is used to advance a story and create mood, place and emphasis. It focuses on the relationship among dialogue, foley, ambience, sound effects and music to create an animation’s soundtrack. This module places an emphasis on developing listening skills in hearing rhythm, melody and harmony.

LEVEL 3.2

Internship
The primary aim of this final year industry-based project is to nurture the spirit of innovation and enterprise in students and broaden their experience beyond classroom learning. Using the demo program prototyped in the earlier semester under the Concept Development module, students will approach companies to seek sponsorship of their ideas and develop the idea into a full working product. Local or overseas attachments are possible.