Master of Information Technology (MIT)
Course Guide

Campuses

Parramatta Campus

Office 5, 2 Sorrell Street, Parramatta NSW 2150

Phone: +61 2 8007 6262

Sydney Campus

Level 3, 22 Goulburn Street, Sydney NSW 2000

Phone: +61 2 8007 6262

Melbourne Campus

Level 7, 123 Lonsdale Street, Melbourne VIC 3000

Phone: +61 2 8007 6262 (transfer from Sydney Campus)

Website: Apex Australia Higher Education

Apex Institute of Higher Education t/a Apex Australia Higher Education

Contents

Apex Australia Higher Education
CRICOS Provider Code: 03967J | TEQSA ID: PRV14320 | ABN: 45 615 071 853
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WHY STUDY AT APEX AUSTRALIA HIGHER EDUCATION (AHE)

Apex Australia Higher Education is an emerging, industry focused private provider of Higher Education for international and domestic students in Australia.

- Our students are our first priority, and the second and the third and the last priority!
- We aim to ensure that the student experience is of the highest quality, ensuring they are engaged, assisted and ultimately ready for the workforce.
- Academic progression is an essential part of the student experience, and we aim to support that with additional academic support.
- We also ensure that the students are supported from a health and well-being aspect via our student services.

COURSE DESCRIPTION

The Master of Information Technology program is designed to meet the Australia Computer Society's (ACS) requirements for course accreditation, having fulfilled the Core Body of Knowledge (CBoK) as specified by the ACS. The course aims to produce Information Technology (IT) graduates who will be eligible to gain employment in a range of different and modern areas of Information Technology. Being designed to meet the Australian ACS requirements for accreditation ensures the quality and industry-readiness of its graduates.

The course is built on providing students with foundational knowledge of core and key areas of information technology and systems. Specialisation units in the second year provide opportunities for study in current important and contemporary IT areas including Cloud and DevOps Engineering, Computer Networks & Systems Engineering, and Software Engineering. The course is characterised by an end of program capstone project comprising two connected units. These capstone units provide students with the opportunity to work in a team to solve a complex real-world information technology problem, drawing from the knowledge and skills acquired over the whole program of study.

The GCIT/GDIT/MIT nested set of courses has been designed to include both a Graduate Certificate of Information Technology and Graduate Diploma of Information Technology as both entry and exit points.

COURSE INTAKES

AHE normally offers three (3) intakes per year into Semester 1, Semester 2, and Semester 3 (NB: Semester 3 is regarded as the Summer Semester). Occasionally, AHE may offer additional entry points in the middle of a semester where the students begin with 2 units in an intensive study mode, (i.e. 2 classes per week per unit, with 2 units studied over 6 weeks).

For subsequent years of study, (i.e., for continuing students), the Summer Semester, (i.e., Semester 3 normally starting in November), will likely offer only a very limited range of units primarily directed at students remediating failures. Students are not expected to fast track by taking additional units over the Summer Semester. The three (3) intakes per year provides students with the flexibility of when they wish to start a new course at AHE. Full-time students normally take four (4) units of study per semester (2 units per Block, NB: a 'Block' being half a semester).

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COURSE DURATION

The Master of Information Technology (MIT) is a 2-year full-time course comprising 16 units, (160 Credit Points). A full-time student will normal undertake four (4) units (subjects) of study per semester and normally undertake two (2) semesters of study per year.

Domestic students can study a part-time MIS, taking up to a maximum four (4) years to complete the course.

MODE OF STUDY AND STUDY WORKLOAD

Full-time students normally undertake four (4) units (subjects) of study during a semester, undertaking 2 units per Block. Each unit includes six (6) hours of teaching (2-hours online + 4-hours face-to-face) and eighteen (18) hours of independent learning per unit, per week. Across 2 the units undertaken per block, this gives a total of twelve (12) hours teaching per week, and thirty-six (36) hours of independent study per week.

GRADUATE ATTRIBUTES (GAs)

At the end of their course, students who graduate with the AHE Master of Information System course will have developed the following attributes:

GA 1: Knowledgeable and skilled in their chosen discipline

GA 2: Effective communicators and collaborators

GA 3: Critical, creative, and analytical professionals

GA 4: Responsible, ethically, and socially aware

Fulfilment of the above Graduate Attributes should enable AHE graduates to be life-long learners.

COURSE LEARNING OUTCOMES (CLOs)

Graduates of the AHE Master of Information Technology will have demonstrated achievement of the following Course Learning Outcomes and be able to:

CLO 1: Apply advanced and contemporary knowledge and skills to solve a range of information technology problems.

CLO 2: Critically evaluate opportunities and challenges in the development of information technologies solution to problems in organisations and society.

CLO 3: Create justifiable and creative solutions to complex information technology problems through research and use of industry standard methodologies, working individually and/or collaboratively in teams.

CLO 4: Communicate complex information technology concepts and solutions effectively to both technical and non-technical stakeholders.

CLO 5: Apply and integrate professional, ethical, and sustainability behaviours into information technology investigations, system developments, and solutions.

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COURSE STRUCTURE AND SEQUENCE

The Master of Information Technology (MIT) course structure consists of 16 units of study, with 10 core units, 4 specialisation units, and 2 electives. The course includes 5 core foundational level units, 4 core units at intermediate level, an advanced core capstone unit, and at least 3 of the 4 specialisation units being advanced level units. The course also includes 2 unrestricted postgraduate electives. Typically, students will choose their elective units from the pool of MIT specialisation units or appropriate units from the AHE Master of Information Systems course.

In addition to a non-specialised version of the MIT, there are currently three specialisations designed to be offered within the MIT. These are: 'Cloud & DevOps Engineering', 'Computer Network & Systems Engineering', and 'Software Engineering'. If students complete all four units from within a specialisation, the name of the specialisation will be included on their transcript/AHEGS. Further specialisations may be developed and offered in the future.

The structure and typical sequencing of the MIT is as follows (NB: Each unit is 10 credit points (cps):

Unit Code	Unit Title	Prerequisites	Credit Points
First Study Period			
ICT5101	Information Systems and Networks	Nil	10
ICT5102	Programming Principles	Nil	10
ICT5103	Project Management for IS/IT	Nil	10
ICT5104	Database Systems	Nil	10
Second Study Period			
ICT5105	Systems Analysis and Design	Nil	10
ICT5201	Cyber Security	ICT5101	10
ICT5202	Data Analysis	ICT5104	10
ICT5205	Cloud Computing	ICT5101 and ICT5104	10
Level 200 Subjects – 2nd Year			
Third Study Period			
ICT5220	Applied IT Project – Part A	60 credit points including ICT5103	10
See below	Specialisation Unit 1	Varies	10
See below	Specialisation Unit 2	Varies	10
See below	Postgraduate Elective unit 1 (can be at foundational, intermediate, or advanced level)	Varies	10
Fourth Study Period			
See below	Specialisation Unit 3	Varies	10
See below	Specialisation Unit 4	Varies	10
See below	Postgraduate Elective unit 2 (can be at foundational, intermediate, or advanced level)	Varies	10
ICT5320	Applied IS Project – Part B	100 credit points including ICT5220 Applied IT Project – Part A, and at least one specialisation unit	10

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Specialisation Units

Unit Code	Unit Title	Prerequisites	Credit Points
Cloud and DevOps Engineering			
ICT5301	Software Development and DevOps	ICT5102, and ICT5105	10
ICT5302	Software Testing and Deployment	ICT5102, and ICT5105, and ICT5205	10
ICT5303	Cloud Security and Privacy	ICT5201, and ICT5205	10
ICT5304	DevOps Automation	ICT5102, and ICT5205, and ideally after ICT5301	10
Computer Networking & Systems Engineering			
ICT5204	Networking Technologies	ICT5101	10
ICT5305	Designing Networks	ICT5204	10
ICT5306	Wireless Networks and Security	ICT5201, and ICT5204	10
ICT5307	Internet of Things	ICT5201, and ICT5204	10
Software Engineering			
ICT5302	Software Testing and Deployment	ICT5102, and ICT5105, and ICT5205	10
ICT5308	Object-Oriented Design & Development	ICT5102, and ICT5105	10
ICT5309	Data Structures, Algorithms, and Design Patterns	ICT5102, and ICT5105	10
ICT5311	UX Design & Mobile App Development	ICT5102, and ICT5104, and ICT5105, and ICT5201	10
Generic MIT (i.e., no specialisation) Units			
See Above	Choose any 4 units from the specialisation units listed above, three of which must be coded ICT53xx.	Varies	4 x 10

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Elective Units

Unit Code	Unit Title	Prerequisites	Credit Points
	Choose 2 additional units from the list of specialisation units above or other postgraduate units offered by Apex Australia Higher Education.		2 x 10

Students may select any units from other specialisation within the MIT as electives or the following units from the MIS:

Unit Code #	Unit Title	Prerequisites	Credit Points
ICT5106*	IS Operations and Service Management	Nil	10
MIS5301	Cyber Security Law and Ethics	ICT5201 Cyber Security	10
MIS5302	Cyber Security Incident Response and Management	ICT5201 Cyber Security	10
MIS5303	Securing Software	ICT5102 Programming Principles + ICT5201 Cyber Security	10
MIS5304	Cyber Security Risk Management	ICT5201 Cyber Security	10
MIS5305	Data Mining	ICT5202 Data Analysis^	10
MIS5306	Machine Learning	ICT5202 Data Analysis	10
MIS5307	Predictive Analytics and Visualisation	ICT5202 Data Analysis	10
MIS5308	Social and Web Analytics	ICT5202 Data Analysis	10
MIS5309	Natural Language Processing & Deep Learning	ICT5202 Data Analysis	10
MIS5310	Intelligent Systems	ICT5202 Data Analysis	10
MIS5311	Autonomous Systems	ICT5202 Data Analysis	10

* - Recommended elective to take as part of the MIT

- Or any other unit approved by the Course Coordinator.

^ - ICT5202 Data Analysis is coded MIS5202 in the MIS.

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ADMISSION CRITERIA

Please refer to **HE-AP04 Student Admission Policy and Procedure,** available on the AHE website for admissions information.

POLICIES

Further information on the AHE's policies and procedures or to download, including those refer to below, please refer to the Apex Australia Higher Education Website.

- Student Admission Policy and Procedure
- English Language Requirements for Admission
- Student Application for Admission Form

FEES AND CHARGES

Refer to the AHE website to view to current fees and charges for the MIT.

CAREER OUTCOMES

AHE Master of Information Technology graduates are expected to find employment in IT-related areas including:

- Cyber Security Analyst/ Cyber Security Technician
- Networking Engineer/Network Specialist
- Software Developer/Software Engineer
- Cloud Engineer/Cloud Computing Engineer
- DevOps Engineer
- Software Tester
- Systems Analyst
- Technical Support Officer
- User Experience Analyst

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UNIT DESCRIPTIONS

Listed below is a typical sequence of units throughout the MIT. However, unit sequencing may vary for different students depending on your starting semester and whether RPL applies.

FIRST STUDY PERIOD

ICT5101 Information Systems and Networks

This unit introduces students to the key concepts and technologies of information systems and computer networks that drive efficiency and effectiveness in modern organisations. Students will gain a clear understanding of modern information system componentry and how computer networks are constructed and operate. They will also consider both the benefits and inherit risks of cloud computing, ubiquitous computing, the Internet of Things, and artificial intelligence.

Students will gain an understanding of privacy, ethical, and security issues associated with modern information systems. Finally, students will develop their research and critical analysis skills and be able to apply these skills to critique information sources and report their findings in an academically sound manner.

ICT5102 Programming Principles

In this unit, students are equipped with a strong foundation in programming concepts and techniques using Python. Throughout the unit, students will develop skills in designing, coding, and testing of both procedural and object-oriented programs to solve problems. In addition, students will learn to use and differentiate both procedural and object-oriented programming paradigms.

Students will learn to apply appropriate data structures and algorithms to solve programming tasks and use Python packages in data analysis to create well-structured and documented Python programs. Finally, students will learn how to apply appropriate testing and exception handling techniques to ensure their programs are robust and efficient.

ICT5103 Project Management for IS/IT

In this unit students will learn how to utilise the industry standard traditional and agile approaches in project management to effectively manage information systems (IS) and information technology (IT) projects. Students will analyse and evaluate different project management methodologies, and design and develop a project plan and schedule for an IS project.

Students will learn how to apply IS/IT project management risk management principles and evaluate/select appropriate IS/IT project management tools and technologies. Students will also learn the importance and appropriate strategies of effective communication with stakeholders as well as AI technologies are changing the way that project managers function.

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ICT5104 Database Systems

Digital information systems produce vast amounts of data, and appropriate management of this data is essential for decision making and value-adding. This unit introduces the fundamental concepts in database design and development, covering the conceptual level and physical level of database management systems (DBMS). In this unit, students will learn how to model business data using standard data modelling methodologies and apply this for the conceptual, logical, and physical design of relational databases.

Students will also learn to apply industry standard languages and approaches to create, query and manipulate databases. The practical challenges involved with deploying database management systems such as database performance tuning, transaction management, Internet connectivity, and security are also covered. Contemporary approaches and technologies for the storage and retrieval of semi-structured and unstructured data are examined.

Finally, the impact that AI technologies are having on the way data is storage, managed, and used will be explored, along with how databases are a key element of the GenAI revolution.

SECOND STUDY PERIOD

ICT105 Systems Analysis and Design

In this unit, students develop skills in systems analysis and design. The unit will provide an overview of the Systems Development Lifecycle (SDLC) and its associated techniques and methodologies. SDLC is the process applied by organisations when designing and developing information systems.

The unit will look at two types of SDLC, specifically waterfall and iterative (agile). Students will learn and apply user/task-centred design methodology as a foundation of good systems design. Students will learn to review and consider the drivers and purpose of projects aimed at the development of new or revised information systems.

They will then develop system requirements (elicitation and specification) using techniques, tools, and perspectives essential for information systems analysts. The unit will require students to apply the tools and techniques of system analysis and design to solve a real industry business.

ICT5201 Cyber Security

Prerequisite: ICT5101 Information Systems and Networks

This unit provides students with a comprehensive understanding of the key concepts and principles of cyber security. The course covers a range of topics, including the fundamentals of network security, cryptography, cyber threats and attacks, risk management, and incident response. Students will learn about the latest technologies and techniques used to protect computer networks and systems from cyberattacks, as well as the legal and ethical issues related to cyber security.

Students will also learn how AI technologies can be used to enhance cyber security defence mechanisms but can also play an increasing role in cyber threats and attacks. Students will gain key insights into identifying and mitigating security risks, approaches to designing secure systems, and implementing best practices in cyber security. By the end of the unit, students will have a solid foundation in cyber security that can be applied to a range of industries and roles, from IT professionals to business managers and executives.

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ICT5202 Data Analysis

Prerequisite: ICT5104 Database Systems

This unit provides students with an overview of the complex area of data analysis. Students will learn to apply key statistical approaches and draw inferences from sample data. They will also learn the underpinning approaches used in modern data analytics systems and be able to use and critically assess a range of data analysis and visualisation tools to interpret data sets.

Students will learn about potential bias in data sets and be able to assess the quality and integrity of data sources, as well as the social and ethics dimension of large-scale collection and use of personal and behavioural data.

Students will also explore the role that AI will play in streamlining data collection, preparation, and analysis for improved forecasting and predictive analysis particularly related to big data.

ICT5205 Cloud Computing

Prerequisite: ICT5101 Information Systems and Network, and ICT5104 Database Systems.

Cloud computing allows the provision of computing services such as software, storage, analytics, and intelligence over the Internet. It enables service users to trade fixed computing expenses for usage based variable expenditures, to benefit from reduced service costs due to economies of scale, increase agility and flexibility, and to reduce maintenance costs.

This unit starts by discussing the business case of cloud computing, including benefits, challenges, business models, and types. Thereafter, it dives deep into the underlying technology of cloud computing systems and covers an overview of virtualisation, containers, and virtual networks. It also covers selected topics in automation and orchestration, which are essential for cloud computing systems.

Students experience implementing and deploying basic cloud applications and learn about cloud computing programming paradigms. This unit also facilitates students' exploration of new and emerging technologies that are closely connected to cloud computing, such as Edge Computing, Industrial Internet of Things (IIoT), and Software Defined Networks (SDN), and AI. In this unit students also explore the opportunities and challenges for cloudbased solutions.

THIRD STUDY PERIOD

ICT5220 Applied IT Project – Part A

Prerequisites: 60 credit points including ICT5103 Project Management for IS/IT and ICT5105 Systems Analysis and Design.

In ICT5220 Applied IT Project – Part A, combined with the ensuing unit ICT5320 Applied IT Project – Part B, students will demonstrate application of the knowledge and skills gained throughout the course by tackling the development of a solution to a complex IT problem. In this unit, students will work within a team to address a real-world complex IT problem by applying industry standard and modern IT iterative and incremental project development methodology such as UP (Unified Process) Model.

Students will elucidate the IT problem and associated imperatives/drivers of key stakeholders. The students will explore and document the project definition and scope and then develop a set of justifiable system requirements and specifications that define the system to be built to solve the IT problem. The team of students will assess various technologies and/or approaches to determine a feasible approach for the creation of a solution.

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Finally, the team will create a prototype demonstrating the concept of the proposed solution and a system design for the Minimum Viable Product (MVP). Students also will consider and address any ethical, sustainability, security and/or privacy impacts of potential solutions.

Specialisation Unit 1

Students select their first specialisation unit: See the table above for the list of available specialisation units.

Specialisation Unit 2

Students select their second specialisation unit: See the table above for the list of available specialisation units.

Postgraduate Elective Unit 1 (Foundational, Intermediate or Advanced Level)

Students select their first elective from the list of specialisation units within the MIT or other postgraduate units offered by AHE.

FOURTH STUDY PERIOD

Specialisation Unit 3

Students select their third specialisation unit (unit drawn from a MIT specialisation coded ICT53xx): See the table above for the list of available specialisation units.

Specialisation Unit 4

Students select their fourth specialisation unit (unit drawn from a MIT specialisation coded ICT53xx): See the table above for the list of available specialisation units.

Postgraduate Elective Unit 2 (Foundational, Intermediate or Advanced Level)

Students select their second elective from the list of specialisation units within the MIS or other postgraduate units offered by AHE.

ICT5320 Applied IT Projects – Part B

Prerequisites: 100 credit points including ICT5220 Applied IT Project – Part A, and at least one specialisation unit.

This unit follows from ICT5220 Applied IT Project – Part A and together these demonstrate the ability of a student to develop a solution to a complex IT problem. Working as a team, students start by reviewing the set of system requirements and specification together with a design for a Minimum Viable Product (MVP) that was previously developed in the preceding unit.

Students have an opportunity to refine the specifications and apply the Unified Process (UP) Construction & Transition phases of the iterative and incremental project development methodology to test their design based on further considerations and stakeholder feedback. The design of the MVP is refined and a project plan for the implementation of the MVP is created during the Transition phase, to ensure that the functional requirements have been addressed and documented properly.

The MVP is then implemented with feedback from stakeholders prior to implementation of the full system. Students will document and present the system along with a detailed project report to explain the operation of the system and how it addresses the complex IT problem. Students will justify choices made and approaches taken, as well as discuss the methods/techniques adopted in the development of the IT solution.

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Cloud and DevOps Engineering Specialisation Units

ICT5301 Software Development and DevOps

Prerequisite: ICT5102 Programming Principles, and ICT5105 Systems Analysis and Design.

DevOps evolved from a movement to better link software development activities (Dev) with IT operations activities (Ops) within organisations to facilitate the linkage and integration between development teams with operations teams to form one continuous process. The emergence of DevOps as a transformative paradigm is rooted in the demand for continuous operation, necessitating ongoing patching, updates, and feature enhancements in modern enterprise systems.

This unit not only introduces students to foundational concepts but also delves into advanced practices and technologies. Topics covered include Infrastructure as Code techniques, Infrastructure as a Service, the establishment of continuous integration and continuous deployment (CI/CD) pipelines for efficient software version delivery, utilisation of containers and container orchestration tools, automation of deployment and containerised applications using open-source tools, and the principles of Microservices.

Students will engage with service management frameworks, establish performance targets and metrics, and conduct maturity assessments, thereby gaining a comprehensive understanding of DevOps best practices through insightful case studies.

This multifaceted approach ensures that students not only grasp fundamental principles but also develop an advanced skill set aligned with contemporary industry requirements. The impact of AI tools and approaches will also be explored.

ICT5302 Software Testing and Deployment

Prerequisite: ICT5102 Programming Principles, and ICT5105 Systems Analysis, and Design and ICT5205 Cloud Computing.

This unit introduces students to the key concept of an essential phases of System Development Life Cycle (SDLC), which are software testing and deployment. This is necessary to professionally exhibit building and delivering the software applications to the real-life production in a secure environment.

Students will gain a theoretical and a practical analysis about the most appropriate and secure advanced techniques of testing the software applications including functional and non-functional testing. Moreover, student will delve in functional testing types such as unit testing, integration testing, user acceptance testing, smoke and sanity testing and security testing. The security testing includes black box testing and white box testing with various software framework tools to equip students with the knowledge and skills related to industry best practice that support continuous integration / continuous deployment (CI/CD).

In additional to functional testing, students will learn designing and evaluating the non-function testing that supports the software deployment on-premises or on the cloud in a secure environment. Students will critically review different options of hosting software applications depending on the required performance, usability, scalability, and security. They will be provided with a simple hosting example, and more advanced cloud hosting methods on cloud-based web services platform (such as AWS).

Finally, the impact that AI technologies are having on the software testing automation and management will be discussed including various testing and secure deployment techniques.

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ICT5303 Cloud Security and Privacy

Prerequisite: ICT5201 Cyber Security, and ICT5205 Cloud Computing.

This unit introduces students with the basic and advance concepts in security and privacy in cloud computing, for services and environments. Cloud computing and cloud services are crucial part of our lives in modern society whether we use these services for business, entertainment, or socialisation. There is a large amount of data including personal and financial sensitive information in the cloud. Hence, cloud services become an attractive target for adversaries.

This unit discusses the best practices for securing data and other services in the cloud to protect data and information privacy against adversarial attacks. The unit begins by introducing the best practices in security and privacy for cloud compute, storage and networking services. Throughout this unit, students will develop skills and knowledge of understanding cloud service models, designing best security and privacy protocols for cloud services and implementation plans for deploying these security protocols. In addition to an overall security perspective, the unit provides practical examples from some large cloud service providers such as AWS, Microsoft Azure and Google Cloud Platform etc.

The unit emphases on the compliance and regulatory requirements related to cloud security and privacy and provides knowledge and skills to students related to compliance and regulations. The unit develops students' skills on how to engage with cloud service providers to decide on the best and economical service plans that suit to the requirements of an enterprise.

Finally, the potential impacts of AI on cloud security and privacy will be explored both from a new threat dimension as well as exploring possible tools and technologies that help automate security processes.

ICT5304 DevOps Automation

Prerequisite: ICT5102 Programming Principles, and ICT5205 Cloud Computing, and ideally after ICT5301 Software Development and DevOps.

This unit aims to cultivate advanced competencies in students within the specialised realm of DevOps automation, emphasising the adept deployment of iterative updates to applications already in production to foster a continuous and agile delivery pipeline. In the dynamic landscape of modern software development and IT operations, the imperative lies in orchestrating and automating workflows systematically to attain heightened efficiency and agility.

The unit explores the foundational principles, sophisticated tools, and advanced techniques that constitute the bedrock of triumphant automation practices within the DevOps framework. Students will analyse, synthesise, and apply novel concepts – such as artificial intelligence and the blockchain - to optimise DevOps automation.

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Computer Networking and Systems Engineering Specialisation Units

ICT5204 Networking Technologies

Prerequisite: ICT5101 Information Systems and Networks

This unit introduces students to the key concepts in networking technologies and computer networks to drive efficiency and effectiveness in modern organisations. Students will consider both the benefits and inherit risks of modern-day networking applications which are part of every aspect of our lives.

Students will gain a clear understanding of modern networking concepts and underlying technologies such as physical layer, networking protocols and standards, design and development of practical networking technologies for personal as well as enterprise applications. Students will also gain an insight on the practical application of networking technologies in solving real life networking issues and challenges.

The unit discusses how the various theoretical networking concepts can be applied into building actual communication networks. The concepts of physical and wireless media are explored in the unit along with benefits of layered OSI model and related protocols. Wireless LANs, broadband wireless technologies, Bluetooth and RFID technologies are some of the examples covered in this unit.

Students gain skills in routing, QoS and internetworking with thorough understanding of IP addressing for various networks. Application layer concepts such as DNS, Email, WWW, streaming and delivery of contents are also discussed in the unit.

Finally, students will develop their research and critical analysis skills and be able to apply these skills to critique networking technologies and report their findings in an academically sound manner.

ICT5305 Designing Networks

Prerequisite: ICT5204 Networking Technologies.

This unit introduces students to the key concepts and technologies for designing computer networks for individual and enterprise applications. Students will learn advanced networking knowledge and skills in network architecture, analysing needs of individuals as well as enterprise related to networks, propose appropriate network design, implement the proposed network design and analyse the performance of the designed network using professional standards.

Students will develop their capabilities in designing, working and troubleshooting practical networks and related technologies such Local Area Networks (LANs), Wide Area Networks (WANs), Software Defined Networks (SDN) and Internet of Things (IoT).

The unit emphasis of dual aspects of network design namely, investigating the user requirements and designing and implementing the practical cutting edge networking technologies. Students will learn how to customise their proposed design as per the needs of customers (individual as well as enterprise) and then using best industry practices implement their proposed design.

Students will learn measuring performance of the networks using professional standards. Finally, students will learn how to apply appropriate design measures for the best user experience and explore the impact that AI may have on designing and troubleshooting networks

ICT5306 Wireless Networks and Security

Prerequisite: ICT5201 Cyber Security, and ICT5204 Networking Technologies.

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This unit introduces the students with some basic and advanced concepts of wireless communication and network security. Wireless communication is everywhere as in modern society, we want to be connected everywhere, anywhere and anytime. The role of wireless communication in our daily lives is critical whether it's for entertainment, work, socialisation or business.

The invention of new wireless communication technologies such as 5G, Massive MIMO and Internet of Things have made this role even more critical. This unit discusses the basic as well as advanced concepts of wireless communication and emphasises on the role of these technologies in modern society.

The unit begins with introducing the fundamental radio frequency communication networks and how they evolve to the modern complex systems. The importance of frequency spectrum and its uses in wireless communication are then discussed.

The role of modern AI and ML technologies in wireless networks and security are discussed in the unit. For a practical wireless communication network, knowing functionality of various components is crucial which is covered in this unit. Several wireless networks spanning from personal area networks to more broad enterprise networks are taught to the students.

Finally, wireless network security challenges and concerns are discussed, and their mitigation strategies are presented in the unit. stakeholders.

ICT5307 Internet of Things

Prerequisite: ICT5201 Cyber Security, and ICT5204 Networking Technologies.

This unit introduces students to the latest concepts and technologies used in the Internet of Things (IoT). IoT is one of the most rapidly evolving technologies today and this unit imparts the knowledge, skills and practical use cases of IoT ecosystems to students. Students will learn a combination of technical and high-level understanding of the principles of IoT systems.

Students will gain a clear understanding of the practical use cases of IoTs in real life applications. The unit covers some basics of data communication and networking technologies, IoT architecture, IoT smart sensors, IoT connectivity, analytics and IoT security and privacy and IoT use case examples.

The unit begins with the introduction of IoTs and present several examples of IoT use cases to teach students how IoT can be applied to various IoT verticals. The concept of smart sensors as well as their use in IoT ecosystem is then described. Because internet connectivity is an essential part of any IoT system, the unit explores wired and wireless connectivity schemes including cellular IoT in the 4G and 5G eras.

The impact of AI technologies on IoT based smart applications is also explored in the unit. Throughout the unit, students will develop skills related to IoT protocols, analytics as well as IoT security and privacy which are important and essential elements of any IoT system. Artificial Intelligence and Machine Learning techniques are crucial part of any IoT system and are taught in the context of IoT systems in this unit.

Finally, students will learn how to design IoT based smart applications that can be implemented for many real-life scenarios.

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Software Engineering Specialisation Units

ICT5302 Software Testing and Deployment

Prerequisite: ICT5102 Programming Principles, and ICT5105 Systems Analysis and Design, and ICT5205 Cloud Computing.

This unit introduces students to the key concept of an essential phases of System Development Life Cycle (SDLC), which are software testing and deployment. This is necessary to professionally exhibit building and delivering the software applications to the real-life production in a secure environment.

Students will gain a theoretical and a practical analysis about the most appropriate and secure advanced techniques of testing the software applications including functional and non-functional testing. Moreover, student will delve in functional testing types such as unit testing, integration testing, user acceptance testing, smoke and sanity testing and security testing. The security testing includes black box testing and white box testing with various software framework tools to equip students with the knowledge and skills related to industry best practice that support continuous integration / continuous deployment (CI/CD).

In additional to functional testing, students will learn designing and evaluating the non-function testing that supports the software deployment on-premises or on the cloud in a secure environment. Students will critically review different options of hosting software applications depending on the required performance, usability, scalability, and security. They will be provided with a simple hosting example, and more advanced cloud hosting methods on cloud-based web services platform (such as AWS).

Finally, the impact that AI technologies are having on the software testing automation and management will be discussed including various testing and secure deployment techniques.

ICT5308 Object-Oriented Design & Development

Prerequisite: ICT5102 Programming Principles, and ICT5105 Systems Analysis and Design.

This unit provides students with a comprehensive understanding of object-oriented principles and practices in software design and development. It focuses on applying these concepts in creating robust, maintainable software solutions.

Students will explore object-oriented programming (OOP) core concepts, methodologies, modelling techniques, design patterns, and best practices, gaining skills to analyse, design, and implement software systems effectively using OOP techniques.

The unit begins by introducing students to the foundational principles of OOP, emphasising the concepts of encapsulation, inheritance, and polymorphism. It further explores the importance of testing and quality assurance in object-oriented design to ensure the software is robust and reliable. contexts.

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ICT5309 Data Structures, Algorithms, and Design Patterns

Prerequisite: ICT5102 Programming Principles, and ICT5105 Systems Analysis and Design.

The unit provides students with solid foundations in the use of data structures and algorithms in software development. The main objective of the unit is to teach the students to select and design appropriate data structures and algorithms that address specific types of problems.

The unit also covers software design patterns and how these can be used aid in the design and development of efficient, effective, and robust software systems. This unit covers the concept of 'correctness of algorithms', as well as the computational complexities associated with differing algorithms.

This unit is design to cover both the important theoretical knowledge as well as in applying these to gain real practical experience. The study of data structures, algorithms, and design patterns is carried out within an object-oriented context.

ICT5311 UX Design & Mobile Application Development

Prerequisite: ICT5102 Programming Principles, and ICT5104 Database Systems, and ICT5105 Systems Analysis, and Design and ICT5201 Cyber Security.

This unit covers the design and development of mobile applications from a technical and user experience perspective. The underlying environments made available by mobile devices will be reviewed and the relative merits of different implementation technologies will be evaluated. Important aspects of the mobile UI/UX design processes will be covered with perspectives of graphic designers, stakeholders, designers from non-tech backgrounds, and developers.

The relationship between mobile applications and the web will be discussed as well as the requirements for providing an effective user experience for offline and intermittently connected devices. The unit will also cover the design of the user experience for mobile applications and develop students' ability to critically evaluate the usability of a mobile design. The unit will also explore how AI tools can enhance productivity in mobile application development. reality.

Elective Units

Students are to choose two (2) additional units from the list of specialisation units above or other postgraduate units offered by Apex Australia Higher Education.

ICT5106 IS Operations and Service Management

Information Systems Operations and Service Management is critical for every business, especially those concerned with delivering value to customers. This unit introduces students to the principles, tools, quantitative models, and strategies used in the IS Operations and Service and examines key issues facing both service and manufacturing organisations. In this unit, students develop an understanding of product and service design, technology-enabled innovations, process design, operations planning and control, quality, performance, and IT service delivery.

Students are equipped with the basic skills and techniques to analyse operations in a digitalised world and methodology and approaches to improve these. In addition, this unit explores the concepts of information technology enabled innovations and IT services and equips students with an ability to evaluate, implement and manage enabling technologies in business operations. Students will also be introduced to important and emerging standards and practices, such as Information Technology Infrastructure Library (ITIL) and cloud-based tools for operations and service management.

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MIS5301 Cyber Security Law and Ethics

Prerequisite: ICT5201 Cyber Security

This unit focuses on cyber security ethics and law and is designed to provide students with a comprehensive understanding of the legal and ethical issues associated with cyber security. The course will cover a wide range of topics such as privacy, data protection, intellectual property and cybercrime, and their implications for individuals, organisations, and society. Students will learn how to assess and evaluate the role of laws, regulations, and industry standards, in governing cyber security and their effectiveness in promoting cyber security and protecting against cyber threats.

The unit will also focus on analysing the legal and ethical considerations associated with risk assessment, risk mitigation, and incident response. Additionally, students will appraise the ethical and social implications of emerging technologies and trends in cyber security such as artificial intelligence, the Internet of Things (IoT) and the blockchain, and their impact on individuals, organisations, and society. They will be encouraged to critically evaluate these implications and identify strategies to address them. Furthermore, the course will equip students with a range of communication strategies and approaches to effectively convey legal and ethical cyber security concepts to various stakeholders, including legal and regulatory bodies, senior management, technical teams, and the public.

MIS5302 Cyber Security Incident Response and Management

Prerequisite: ICT5201 Cyber Security

This unit centres on the cyber security incident response process and is designed to equip students with the skills and knowledge to effectively manage cyber security incidents. The course will cover the entire incident response process, including identifying, containing, analysing, eradicating, and recovering from cyber security incidents. Students will learn to propose and justify appropriate response strategies towards different types of cyber security incidents, such as malware infections, network intrusions, data breaches, and denial-of-service attacks.

The unit will also focus on evaluating the role of incident response teams and stakeholders, including legal and regulatory bodies, law enforcement agencies, and third-party service providers, in managing cyber security incidents. Students will learn how to select and apply appropriate cyber security incident response tools and technologies, such as forensic tools, network analysis tools, and incident response platforms. Additionally, they will develop effective communication and leadership strategies to manage cyber security incidents, including the development of incident response and stakeholder communication plans.

MIS5303 Securing Software

Prerequisite: ICT5201 Cyber Security

This unit focuses on software security and is designed to provide students with the skills and knowledge to identify and mitigate security risks and vulnerabilities associated with software development. The course will cover various security risks and vulnerabilities associated with software development, including code-level vulnerabilities, design flaws, and configuration errors. Students will learn to develop strategies to address potential security risks and vulnerabilities in software development projects.

The unit will also focus on selecting and justifying a range of secure software development practices, including threat modelling, secure coding, security testing, and vulnerability management in different real-world scenarios. Students will learn to apply security tools and technologies such as static and dynamic analysis tools, penetration testing tools and security libraries, and to identify and mitigate security risks during the software development lifecycle.

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MIS5304 Cyber Security Risk Management

Prerequisite: ICT5201 Cyber Security

This unit will equip students with the knowledge and skills to apply cyber security risk management principles to real-world scenarios. Students will learn how to identify and assess the different types of cyber security risks faced by organisations, including internal and external threats, and develop strategies to mitigate these risks. Through practical case studies, students will gain hands-on experience in applying risk assessment, risk treatment, risk monitoring, and risk communication techniques to manage cyber security risks.

Students will also learn how to evaluate the effectiveness and appropriateness of different risk management frameworks and methodologies such as NIST Cybersecurity Framework (CSF), ISO 27001, and the Factor Analysis of Information Risk (FAIR), for a range of differing organisational situations. Additionally, students will explore and utilise appropriate cyber security risk management tools and technologies, such as risk assessment tools, vulnerability scanners, and security analytics platforms that are used to identify, assess, and monitor cyber security risks. Ultimately, students will learn how to create risk management plans that effectively identify, assess, and mitigate cyber security risks while ensuring that stakeholders from various backgrounds and skill levels understand the risks and their potential impact.

MIS5305 Data Mining

Prerequisite: ICT5202 Data Analysis

This unit is designed to provide students with a comprehensive understanding of data mining techniques and their applications in real-world scenarios. The unit covers the fundamental concepts and techniques of data mining, including data pre-processing, pattern recognition and predictive modelling. Students will learn how to apply data mining techniques and tools to store and analyse complex datasets, including relational and non-relational approaches for structured and unstructured data. They will also evaluate the strengths and limitations of different data mining algorithms and methodologies and choose the most appropriate approach for a given problem based on data characteristics, domain knowledge, and performance metrics.

The unit will equip students with the ability to develop effective data mining strategies and plans for different types of business applications such as customer segmentation, market basket analysis, churn prediction, fraud detection and social media analysis. Additionally, students will learn how to assess a range of data mining approaches to generate meaningful insights and actionable recommendations, for decision-making using cloud and big data technologies. By the end of the unit, students will have the necessary skills and knowledge to apply data mining techniques to real-world problems and generate valuable insights that can inform decision-making and drive business growth.

MIS5306 Machine Learning

Prerequisite: ICT5202 Data Analysis

This unit covers the design and implementation of machine learning (ML) algorithms for production systems. Beginning with mathematical and algorithmic foundations, students will then learn to evaluate the non-functional requirements of ML production systems and design architectures that can meet these needs, taking into account factors such as cost, precision and accuracy. Students will examine deep learning algorithms and a range of advanced techniques such as Bayesian approaches, reinforcement learning and classifier ensembles. Students will also consider how to find and select appropriate data for a range of model types.

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Students will develop the skills to use production machine learning platforms and frameworks to implement machine learning models using real-world scenarios. They will also learn to monitor and manage the performance, availability, and security of machine learning production systems and develop strategies for scaling. Upon completion of this unit, students will be able to design and implement architectures for machine learning production systems that meet the functional and non-functional requirements of modern enterprises, including large language models.

MIS5307 Predictive Analytics and Visualisation

Prerequisite: ICT5202 Data Analysis

This unit centres on developing advanced skills in predictive analytics and data storytelling, providing students with the ability to predict future states of complex datasets, communicate insights through data visualisation techniques, and understand ethical and legal considerations in predictive analytics. Students will study mathematical and statistical models using regression analysis and time series forecasting, enabling them to predict future states of complex, real-world datasets.

Students will also learn to compare and apply a range of predictive analytics and visualisation approaches to explore and solve diverse real-world problems. They will develop skills in formulating communication strategies for data insights using effective data visualisation techniques to assist decision-makers in understanding complex data.

Furthermore, this unit will explore the capacity of data storytelling techniques to communicate complex data insights to a non-technical audience. Students will develop an understanding of ethical and legal considerations in predictive analytics. They will learn to develop strategies for ethical data use and management, including the mitigation of data privacy concerns and algorithmic bias. Graduates of this unit will have the skills and knowledge to apply advanced analytics techniques to solve real-world problems and communicate insights to both technical and non-technical stakeholders.

MIS5308 Social and Web Analytics

Prerequisite: ICT5202 Data Analysis

This unit will equip students with the skills and knowledge required to effectively use data analysis techniques to understand and influence customer behaviour in the context of social media and websites. Through the unit, students will develop an understanding of how to create useful insights for marketing, reputation management and customer service purposes using sentiment analysis techniques. They will also learn how to analyse social network data using large graphs including network graphs and centrality measures, and how network analysis can be used for influencer marketing, viral marketing, and brand awareness.

Students will also gain expertise in designing and implementing A/B tests for website optimisation using appropriate analytics tools. The unit will cover machine learning techniques such as clustering and classification that can be used to predict social/web customer behaviour. Additionally, students will learn how to assess the data requirements to undertake web scraping and associated large-scale data collection and pre-processing approaches while considering the ethical and legal considerations of web scraping. Overall, this unit will provide students with a deep understanding of the data analysis techniques required to effectively influence customer behaviour in today's data-driven business world.

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MIS5309 Natural Language Processing and Deep Learning

Prerequisite: ICT5202 Data Analysis

This unit covers a range of advanced Natural Language Processing (NLP) topics, including text pre-processing, deep learning for NLP, and ethical considerations in NLP practices. In this unit, students will gain a strong understanding of the fundamental NLP concepts and techniques such as tokenisation, stemming, and lemmatisation and how to apply them to various NLP tasks. They will also explore the latest developments in deep learning for NLP and evaluate the performance and accuracy of models for tasks such as text classification, named entity recognition, and machine translation.

In addition, students will learn how to analyse text data using NLP techniques such as sentiment analysis, topic modelling and text summarisation, and understand how NLP can be used for social media analytics, customer feedback analysis, and content generation. They will also evaluate the ethical considerations involved in NLP practices, such as bias, privacy, validation, and explainability. By the end of the unit, students will have gained practical experience in applying large language models to solve NLP tasks and will understand how they can improve AI outcomes in a range of contexts.

MIS5310 Intelligent Systems

Prerequisite: MIS5202 Data Analysis

The unit emphasises the impact of intelligent systems on information systems architectures, designs, and implementations. Students will examine the fundamental concepts of intelligent systems, software bots and robotic process automation and explore how they can be integrated into various information systems. The unit will cover a range of topics including intelligent decision-making, automation of routine tasks and user experience enhancement. Students will also investigate the potential benefits of intelligent systems in enhancing productivity, reducing costs and expanding intelligent system functionality in areas such as computer vision.

Students will evaluate the techniques that intelligent agents and chatbots use to interact with users in natural language and assist them in performing various tasks such as customer service, sales support, and knowledge management. They will also develop policies and guidelines that can ensure the responsible and ethical use of intelligent systems technologies in business environments.

The unit will provide students with the necessary knowledge and skills to analyse the impact of robotics and intelligent systems on future information systems architectures, designs, and implementations. Upon completion of the unit, students will be able to apply these concepts to real-world situations and make informed decisions about the use of intelligent systems technologies in their organisations.

MIS5311 Autonomous Systems

Prerequisite: ICT5202 Data Analysis

This unit aims to provide students with a thorough understanding of fundamental concepts in autonomous systems, including how computer vision and deep learning models can be applied to image and video analysis subtasks. Students will learn about image formation, feature extraction, object recognition and motion analysis, and how these concepts can be used for various image and video analysis tasks in developing autonomous systems. They will gain experience in interpreting these concepts and applying them to practical problems in image and video analysis such as face detection, image restoration and video summarisation.

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Students will also learn how computer vision techniques can be used for applications such as surveillance, medical imaging, and autonomous driving.

Students will assess the performance and accuracy of a range of deep learning models for autonomous systems subtasks such as object detection, semantic segmentation, and action recognition. They will gain practical experience in analysing image and video data using computer vision techniques and applying deep learning models to solve complex problems.

Additionally, students will learn about the ethical considerations involved in image and video analysis such as privacy, bias, and explainability and how to create strategies for ethical image and video analysis practices. Finally, students will recommend real-time image and video analysis approaches appropriate to a range of situations that require real-time data processing, including video surveillance and augmented reality.

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