Master of Information Systems (MIS) Course Guide

Campuses

Sydney Campus

Office 5, 2 Sorrell Street, Parramatta NSW 2150

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Melbourne Campus

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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 Systems (MIS) program is designed to provide students with comprehensive knowledge and applied hands-on skills, across a broad range of key areas of information systems, information technology and business systems. The course prepares graduates to enter a variety of fields within the exciting and ever-evolving Information and Communication Technology (ICT) sector. The MIS features opportunities to study in contemporary and crucial specialisation areas including cyber security, artificial intelligence, and data analytics. Graduates of the MIS will be eligible to gain employment in a range of different and modern areas of information technology and information systems.

The course provides students with foundational knowledge of all the key and core areas of information technology and systems. It covers the impacts of information systems, programming, computer networking and security, data analysis, systems analysis, and design, IS project and operations management. Through the specialisation units, students study a range of selected advanced units in areas such as cyber security, data analytics and artificial intelligence. If a student studies four units from a specific specialisation, the student will graduate from a Master of Information Systems with a specific specialisation included on their transcript.

The course is characterised by an end of program capstone project comprising of two connected units. These capstone units provide students with the opportunity to work in a team to solve a complex real-world business information systems problem. To do this, students draw from the knowledge and skills they have acquired over the whole program of study of the MIS.

Importantly, the course has been specifically designed to ensure that it meets the criteria for professional recognition by the Australia Computer Society (ACS).

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 System (MIS) 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 System will have demonstrated achievement of the following Course Learning Outcomes and be able to:

CLO 1: Apply advanced and contemporary information systems knowledge and skills to business and organisational problems.

CLO 2: Critically evaluate opportunities and challenges in the development of information systems in organisations and society.

CLO 3: Create justifiable and creative solutions to complex information systems problems through research and use of industry standard methodologies.

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

CLO 5: Apply and integrate ethics, sustainability, security, and privacy principles into information system solutions.

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COURSE STRUCTURE AND SEQUENCE

The Master of Information Systems consists of 16 units. In the course there are 10 core units, 4 advanced IS/IT units, (normally comprising a specialisation), and 2 unrestricted postgraduate elective units. Students may select the electives from the pool of units offered from the MIS specialisations or other postgraduate units offered by Apex Australia Higher Education.

If a student completes all the units within the MIS including all the units within a specialisation, they will be awarded an MIS with a specialisation. At the start of their course, students will select their specialisation, or they can opt to complete the non-specialised version. In the case of the non-specialised version of the MIS, students need to complete all the core units, plus 4 advanced MIS, (coded MIS53xx), plus 2 unrestricted electives.

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

Unit Code	Unit Title	Prerequisites	Credit Points
First Study Period			
MIS5101	Information Systems and Networks	Nil	10
MIS5102	Programming Principles	Nil	10
MIS5103	Project Management for IS	Nil	10
MIS5104	Database Systems	Nil	10
Second Study Period			
MIS5105	Systems Analysis and Design	Nil	10
MIS5106	IS Operations and Service Management	Nil	10
MIS5201	Cyber Security	MIS5101	10
MIS5202	Data Analysis	MIS5104	10
Level 200 Subjects – 2nd Year			
Third Study Period			
MIS5203	Applied IS Project – Part A	60 credit points including MIS5105	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
MIS5320	Applied IS Project – Part B	100 credit points including MIS5103, MIS5106, MIS5203, and at least 1 specialisation unit	10

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Specialisation Units

Unit Code	Unit Title	Prerequisites	Credit Points
Cyber Security Specialisation Units			
MIS5301	Cyber Security Law and Ethics	MIS5201	10
MIS5302	Cyber Security Incident Response and Management	MIS5201	10
MIS5303	Securing Software	MIS5201	10
MIS5304	Cyber Security Risk Management	MIS5201	10
Data Analytics Specialisation Units			
MIS5305	Data Mining	MIS5202	10
MIS5306	Machine Learning	MIS5202	10
MIS5307	Predictive Analytics and Visualisation	MIS5202	10
MIS5308	Social and Web Analytics	MIS5202	10
Artificial Intelligence Specialisation Units			
MIS5306	Machine Learning	MIS5202	10
MIS5309	Natural Language Processing and Deep Learning	MIS5202	10
MIS5310	Intelligent Systems	MIS5202	10
MIS5311	Autonomous Systems	MIS5202	10
Generic MIS (i.e. no specialisation) Units			
Varies	Choose any 4 units from the specialisation units listed above coded MIS53xx.	Varies	4 x 10

Elective Units

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

Note: The above represents the standard course structure. The specific sequencing of units may vary depending on the commencement semester as well as the outcome of a student's prior learning assessment (i.e. RPL Credit Assessment).

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SPECIALISATIONS

The MIS contains three specialisations that have been designed to target specific modern area of IS/IT. Students may opt to complete a particular specialisation, or mix-and-match the advanced IS/IT units (coded MIS53xx) within the specialisations.

Data Analytics Specialisation

The Data Analytics specialisation within the Master of Information Systems is a dynamic and comprehensive program, designed to equip students with a solid foundation in both technical and business-oriented aspects of data analysis.

The specialisation unit, **MIS5305 Data Mining** builds upon the core units **of MIS5202 Data Analysis**, and delves into advanced analytics techniques, enabling students to extract valuable insights from vast datasets. Students will also evaluate the strengths and limitations of different data mining algorithms and methodologies. They will also learn how to choose the most appropriate approach for a given problem based on data characteristics, domain knowledge, and performance metrics.

MIS5306 Machine Learning teaches students cutting-edge technologies that underpin modern data-driven decision-making processes and systems. In this unit, students examine a range of approaches to machine learning and use machine learning platforms and frameworks to implement machine learning models using real-world scenarios.

MIS5307 Predictive Analytics and Visualisation 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 the ethical and legal considerations in predictive analytics. The unit prepares students so they are ready to apply modern data analytics tools/approaches when analysing data so predictions about future trends or outcomes can be made. Also, in this unit, students will explore the capacity of 'data storytelling techniques' to communicate complex data insights to non-technical audiences.

MIS5308 Social and Web Analytics empowers students to extract valuable insights by extraction and analysing data from the information presented in websites and posted on social media platforms. From these analyses, students learn to make informed decisions that are valuable to many businesses and organisations. In this unit, students will learn how to collect data and apply machine learning techniques that can be used to predict social/web customer behaviour. 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.

In Australia, and around the world, the area of Data Analytics has become a rapidly evolving field. In 2022, Australia recognised two (2) new occupations in this the field, namely of 224114 Data Analyst and 224999 Data Scientist[1].

However, in late 2023 the Australian Computer Society (ACS) released a new interim code of '**224999 - Information and Organisation Professionals nec (Data Scientist)'** and has released the associated skills for this occupation when they undertake skills assessment for migration purposes.[2] This Data Analysis specialisation provides students with the essential skills and knowledge for them to have an opportunity to enter the dynamic field of Data Analytics.

[1] Refer to: Unit Group 2241 Mathematical Science Professionals | Australian Bureau of Statistics (abs.gov.au)
[2] Refer to: Data Science occupations and ANZSCO codes

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Possible career opportunities that correspond to this specialisation include:

- Business Data Analysts
- Data Analyst
- IT Business Analysts and Consultant

Image source[3]

[3] Image source (copyright free): https://pixabay.com/illustrations/monitor-binary-binary-system-1307227/

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Artificial Intelligence Specialisation

In the Artificial Intelligence (AI) specialisation students will delve deeply into how AI systems can be used to increase the efficiency and effectiveness of information systems. Students will learn the how AI function and how they can be used across a range of different application areas. Students will learn how AI systems are now able to handle the diversity of human language, explore how intelligent system components can be built into various information systems, and delve into the emerging field of autonomous systems.

The Artificial Intelligence specialisation consists of four units: **MIS5306 Machine Learning**, **MIS5309 Natural language processing and Deep Learning**, **MIS5310 Intelligent Systems**, and **MIS5311 Autonomous Systems**.

In **MIS5306 Machine Learning,** student will learn about modern approaches and cutting-edge technologies that underpin the recent advances in modern decision-making and generative AI technologies. Also in this unit, students will develop the skills to use production machine learning platforms and frameworks to implement machine learning models using real-world scenarios.

MIS5309 Natural language processing and Deep Learning, covers how computer systems can be taught to handle the variability and diversity of human language, such as different languages, dialects, genres, styles, and domains. The methodologies studied include capturing of the hierarchical and contextual nature of language, so that the meaning of words, sentences, paragraphs, and documents can be understood by such systems. In this unit, students will learn about the latest developments in deep learning for natural language processing and evaluate the performance and accuracy of models for tasks such as text classification, named entity recognition, and machine translation.

In **MIS5310 Intelligent Systems,** 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. Students will also investigate the potential benefits of intelligent systems in enhancing productivity, reducing costs, and expanding intelligent system functionality.

MIS5311 Autonomous Systems covers the emerging area of Autonomous Systems which are poised to change the way we live. There will be a vast number of areas affected by autonomous systems, and these will change the way we drive, distribute goods, manufacture goods, undertake surveillance, complete dangerous operations such as in search and recovery, as well as many other application areas. Students will gain a thorough understanding of fundamental concepts in autonomous systems, including how computer vision and deep learning models work, and explore a range of application areas of these emerging technologies.

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Possible career opportunities that correspond to the Artificial Intelligence specialisation include:

- AI Engineer
- AI Architect
- AI Consultant
- AI Developer
- Big Data Engineer
- Machine Learning Engineer

Image source[4]

[4] Image created by Bing Image Creator, https://www.bing.com/images/create 27/3/2024 using the prompt '*generate a surreal image that embodies the concepts of artificial intelligence with a silhouette of a human mind as part of the image*.'

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Cyber Security Specialisation

Cyber security is the practice of protecting systems, networks, and programs from digital attacks aimed at accessing, changing, or destroying sensitive information, interrupting normal business processes, or extorting money from users. Robust cyber security requires the effective interplay of people, policies/procedures, and technologies that ensure organisations implement effective access control, encrypt, and secure sensitive data, and educate users about potential threats. Failure to implement robust cyber security measures means that organisations are more susceptible to cyber-attacks that can cripple modern businesses. In this specialisation, students build upon the basic knowledge and skills developed with **MIS5201 Cyber Security,** to delve more deeply into several key areas associated with cyber security.

MIS5301 Cyber Security Law and Ethics covers cyber security governance, policy, ethics, and law. It also covers the pivotal factors that enable organisations to effectively manage risks, as well as respond decisively to data breaches and other forms of cyber-attacks. Students will also be equipped with a range of communication strategies and approaches to effectively convey legal and ethical cyber security concepts, which are crucial skills when communicating cyber security breaches to a range of stakeholders.

In **MIS5303 Securing Softwar**e, students will gain an understanding of how to mitigate the security risks and vulnerabilities associated with software development. This is ultimately aimed at preventing unauthorised access to systems, software, and data. Students will learn how to address potential security risks and vulnerabilities in software development projects, and apply security tools, including penetration testing tools and security libraries, to identify and mitigate security risks during the software development lifecycle.

MIS5302 Cyber Security Incident Response and Management equips students with the skills and knowledge to effectively manage a wide variety of potential cyber security incidents. Students will learn how about how to select and apply appropriate cyber security incident response tools to deal with incidents. They will also learn how to develop appropriate communication strategies to deal with such incidents.

In **MIS5304 Cyber Security Risk Management,** 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. Students also learn about the effectiveness and appropriateness of different risk management frameworks, methodologies, and how risk management tools can assist to identify, assess, and monitor cyber security risks.

A career in Cyber Security could see you working in the following roles (including ANZSCO codes[5]):

- ICT Security Specialist (262112)
- Cyber Governance Risk and Compliance Specialist (262114)
- Cyber Security Advice and Assessment Specialist (262115)
- Cyber Security Analyst (262116)
- Cyber Security Architect (262117)
- Cyber Security Operations Coordinator (262118)

Image source[6]

[5] Refer to: ANZSCO - Australian and New Zealand Standard Classification of Occupations, 2022 | Australian Bureau of Statistics

[6] Image source (copyright free): https://pixabay.com/illustrations/hacker-cyber-crime-internet-2300772/

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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

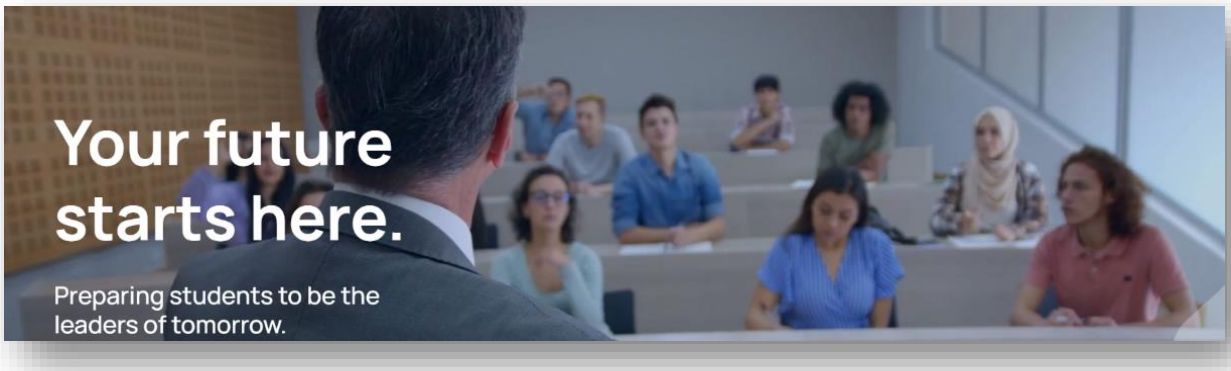
FEES AND CHARGES

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

CAREER OUTCOMES

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

- Cyber Security Analyst
- Data Analyst
- IT Business Analyst and Consultant
- Information System Manager
- IS Project Manager
- Software Tester
- Systems Analyst
- Technical Support Officer
- Machine Learning Engineer



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UNIT DESCRIPTIONS

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

FIRST STUDY PERIOD

MIS5101 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.

MIS5102 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.

MIS5103 IS Project Management for IS

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) 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 project management risk management principles and evaluate/select appropriate IS project management tools and technologies. Students will also learn the importance and appropriate strategies of effective communication with stakeholders.

MIS5104 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.

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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.

SECOND STUDY PERIOD

MIS105 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 problem.

MIS5106 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.

MIS5201 Cyber Security

Prerequisite: MIS5101 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 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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MIS5202 Data Analysis

Prerequisite: MIS5104 Database Systems

This unit provides students with an overview of the complex area of data analytics. 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 analytics 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.

THIRD STUDY PERIOD

MIS5203 Applied IS Projects – Part A

Prerequisites: 60 credit points including MIS5105 Systems Analysis and Design

In MIS5203 Applied IS Project – Part A, combined with the ensuing unit MIS5320 Applied IS 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 business IS problem.

In this unit, students will address a real-world complex business IS problem. By applying industry standard and modern IS iterative and incremental Project development methodology such as UP (Unified Process) Model. Students will elucidate the business problem and associated imperatives/drivers. The students will develop a set of justifiable system requirements and specifications that define the system to be built.

Students will assess various technologies and/or approaches to determine a feasible approach for the creation of a solution. Finally, the students 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 MIS or other postgraduate units offered by AHE.

FOURTH STUDY PERIOD

Specialisation Unit 3

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

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Specialisation Unit 4 (Advanced Level i.e. MIS53XX)

Students select their fourth specialisation unit: 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.

MIS5320 Applied IS Projects – Part B

Prerequisites: 100 credit points including MIS5103 Project Management for IS, MIS5106 IS Operations and Service Management, MIS5203 Applied IS Project – Part A, and 1 specialisation unit.

This unit follows from MIS5203 Applied IS Project – Part A, and together these demonstrate the ability of a student to develop a solution to a complex business IS problem.

In this unit, the 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 business problem. Students will justify choices made and approaches taken, as well as discuss the methods/techniques adopted in the development of the IS solution.

Cyber Security Specialisation Units

MIS5301 Cyber Security Law and Ethics

Prerequisite: MIS5201 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.

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MIS5302 Cyber Security Incident Response and Management

Prerequisite: MIS5201 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: MIS5201 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.

MIS5304 Cyber Security Risk Management

Prerequisite: MIS5201 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.

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Data Analytics Specialisation Units

MIS5305 Data Mining

Prerequisite: MIS5202 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: MIS5202 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.

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: MIS5202 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.

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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: MIS5202 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.

Artificial Intelligence Specialisation Units

MIS5306 Machine Learning

Prerequisite: MIS5202 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.

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.

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MIS5309 Natural Language Processing and Deep Learning

Prerequisite: MIS5202 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: MIS5202 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.

Electives

Students need to complete two (2) unrestricted elective units from any AHE Postgraduate course.

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