Whitireia and WelTec (W&W)

Course Descriptors

Master of Information Technology (MIT)
Postgraduate Diploma in IT (PGDipIT)
Postgraduate Certificate in IT (PgCert IT)

List of postgraduate IT courses currently offered at the School of Innovation, Design and Technology.

1. IT8501- Research in Information Technology
2. IT8510 - Business Analysis for Information Technology
3. IT8511- Business Intelligence and Data Mining
4. IT8512 - Cloud Computing and ICT Infrastructure
5. IT8530 - Advanced Mobile Application Solutions
6. IT8516 - Network Design and Management
7. IT8517 - Network Security and Forensics
8. IT8518 - Quality Assurance and Testing
9. IT8519 - Systems Architecture and Technology Integration
10. IT8531 - The Ethics of Data and Artificial Intelligence
11. IT8524 - Internship
12. IT8502 - Research Proposal
13. IT8526 - Advanced Project Management for Information Technology
14. IT8527 – Cryptography and Security Mechanisms
15. IT8528 - Cybersecurity
16. IT8529 - Blockchain and Cryptocurrency
17. IT8532 - Advanced Artificial Intelligence and Machine Learning
18. IT9501 - Applied Research Project
19. IT9502 - Thesis
20. IT9503 - Advanced Information Management and IT Solutions
21. IT9504 - Leadership in IT and Digital Organisations
22. IT9505 - Advanced Innovation and Design Thinking for IT
23. IT9506 - Integrated Industry Project

IT8501 - Research in Information

Level	Credits
8	15
Learning Hours	45 directed, 105 self-directed
	Elective

Aim

To provide students with a framework for applied research in Information Technology through examining research methods and publications, with reference to research into the impact of Information Technology on society.

Learning Outcomes

At the end of this course, students will be able to:

1. Critically evaluate the suitability of a range of research methods (qualitative, quantitative, and mixed) for application in a specific area of Information Technology.
2. Select, analyse, critique and synthesise research literature in a specific area of Information Technology.
3. Assess the (past, present and future) impacts of specific aspects of Information Technology.
4. Critically analyse ethical issues in the use of Information Technology.

Indicative Content

Research methods (qualitative, quantitative, and mixed), research literature, impact of Information Technology on society (including digital divide, ethical issues, cultural and gender perspectives, environmental and social challenges).

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IT8510 - Business Analysis for Information

Level	Credits
8	15
Learning Hours	45 directed, 105 self-directed
Pre-requisites	Systems Analysis, Design and Control or equivalent knowledge
Aim	Elective

To develop students' ability to analyse, evaluate, and manage business processes within an IT environment. This course focuses on applying business analysis techniques to gather, assess, and document business requirements to support IT solutions.

Learning Outcomes

At the end of this course, students will be able to:

1. Analyse and critically evaluate literature on IT-related business analysis projects, including the success and failure of business process management and case management.
2. Elicit and prioritise business process requirements based on business value, priority, and effort.
3. Design and present a requirements repository using templates, including the use of diagrams such as entity-state diagrams.
4. Develop and validate an object-oriented or relational database that models persistent data for a business process.

Indicative Content

Business Analysis Body of Knowledge, case studies of IT-related business analysis projects, business process management, case management, analysis of requirements (for ambiguities, incompleteness, unstated constraints and conflicts), progressive elaboration in software development methodologies, automation of decisions.

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IT8511- Business Intelligence and Data

Level	Credits
8	15
Pre-requisites	Data Models and Databases or equivalent knowledge
Learning Hours	45 directed, 105 self-directed
	Elective

Aim

To provide students with a framework for identifying and aligning computer-based data analysis strategies with organisational goals to create and sustain competitive advantage.

Learning Outcomes

At the end of this course, students will be able to:

1. Identify and apply appropriate data analysis strategies to meet specific organisational goals.
2. Critically assess the efficacy of a range of data mining approaches (classification, association and clustering) for knowledge discovery within large datasets.
3. Critically evaluate available methods of big data analysis and review possible uses of these techniques for business intelligence

Indicative Content

Business intelligence, data mining tools and techniques, analysis of very large data sets

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IT8512 - Cloud Computing and ICT

Level	Credits
8	15

Pre-requisites	Middleware or equivalent knowledge
Learning Hours	45 directed, 105 self-directed Elective

Aim

To enable students to critically analyse cloud computing and other advances in information and communications technology (ICT) infrastructure and recommend a workable solution (including cloud-related technology) for a given ICT environment.

Learning Outcomes

At the end of this course, students will be able to:

1. Review advances in ICT infrastructure and related applications
2. Analyse the requirements for a cloud infrastructure for a particular ICT environment and critically evaluate the component parts of the infrastructure.
3. Recommend a cloud solution for a particular ICT environment, including security considerations.

Indicative Content

Benefits and challenges of cloud computing, advances in ICT infrastructure, Advanced data handling, cloud computing, distributed computing, intelligent agents, software-as-a-service, virtualisation, web intelligence. Benefits and challenges of cloud computing, advances in ICT infrastructure

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IT8527 - Cryptography and Security Mechanisms

Level	Credits
8	15
Learning Hours	45 directed, 105 self-directed
Status	Elective

Aim

To provide learners with a broad knowledge of advanced cryptosystems, threats in such systems, and the design requirements of secure protocols and systems in business, and high-security environments.

Learning Outcomes

At the end of this course, students will be able to:

1. Critically evaluate principles and application of cryptography in current business and high-security environments.
2. Research and apply security mechanisms to mitigate critical security threats and vulnerabilities in business and high security environments.
3. Research, model and design/deploy real-world applications of cryptographic primitives and protocols in a variety of scenarios in business and high security environments.

Indicative Content

Conventional cryptography, Advanced cryptography, Mechanisms to protect data integrity and authentication, Protocols for identification and login, Authenticated key exchange and management with third parties, Systems, software and web security

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IT8530 - Advanced Mobile Application

Level	Credits
8	15
Pre-requisites	Software Development or equivalent knowledge
Learning Hours	45 directed, 105 self-directed
-	Elective

Aim

To equip students with the knowledge and skills in the development and implementation of innovative mobile application solutions, focusing on cutting-edge technologies, design principles, and the integration of multimedia features to address business, technical, and social challenges on mobile platforms.

Learning Outcomes

At the end of this course, students will be able to:

1. Critically evaluate the impact of multimedia applications on mobile devices, considering business, technical, and social implications.
2. Analyse and assess the suitability of various mobile operating systems for implementing multimedia applications.
3. Design and develop tools to evaluate multimedia applications from a human-computer interaction (HCI) perspective.
4. Create and implement multimedia applications, integrating user-centred design

Indicative Content

Mobile operating systems, Java programming, human-computer interaction (HCI), graphics and animation, business, technical and social implications.

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IT8516 - Network Design and Management

Level	Credits
8	15
Pre-requisites	Systems Administration or equivalent knowledge
Learning Hours	45 directed, 105 self-directed
	Elective

Aim

To provide students with an in-depth understanding of the concepts and procedures used in requirements analysis, design, installation, and management of computer and communication networks.

Learning Outcomes

At the end of this course, students will be able to:

1. Analyse network design considerations, network protocols, and monitoring tools.
2. Analyse the concepts of network requirement processes.
3. Critically assess network management systems and tools
4. Critically assess network architectures and security measures

Indicative Content

Network design considerations, network management protocols, network monitoring, network requirements analysis, flow analysis, network management, performance architecture and analysis.

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IT8517 - Network Security and Forensics

Level	Credits
8	15
Pre-requisites	Internet Security or equivalent knowledge
Learning Hours	45 directed, 105 self-directed
	Elective

Aim

To provide students with a broad knowledge of critical security threats to computer network systems and possible countermeasures, and to provide knowledge of best practice and techniques for investigating breaches of security.

Learning Outcomes

At the end of this course, students will be able to:

1. Investigate the current state of network security and forensics.
2. Critically analyse security measures and their effectiveness.
3. Critically assess forensic investigation techniques and tools for investigating security incidents.

Indicative Content

Security threats, security measures to prevent or mitigate those threats (including firewalls, virtual private networks**,** and honeypots)**,** digital forensic investigation techniques (including acquisition, preservation, analysis and presentation) anti-forensic considerations.

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IT8518 - Quality Assurance and Testing

Level	Credits
8	15

Pre-requisites	Software Development or equivalent knowledge
Learning Hours	45 directed, 105 self-directed
-	Elective

Aim

To provide students with an in-depth understanding of methodologies and techniques used in software testing and quality assurance.

Learning Outcomes

At the end of this course, students will be able to:

1. Critically evaluate methodologies and techniques used in software testing and quality assurance.
2. Analyse software testing techniques and select optimal solutions for different types of projects.
3. Apply suitable software testing techniques and quality assurance methodologies to a specific project.

Indicative Content

Methodologies and techniques used in software testing and quality assurance, software metrics, software quality improvement.

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IT8519 - Systems Architecture and Technology

Level	Credits
8	15
Pre-requisites	Systems Administration or equivalent knowledge
Learning Hours	45 directed, 105 self-directed
	Elective

Aim

To provide students with an understanding of a range of information systems, telecommunications and mobile architectures, and how to integrate these into an enterprise architecture.

Learning Outcomes

At the end of this course, students will be able to:

1. Critically analyse currently available computer system architectures.
2. Evaluate the available integrated communications options.
3. Investigate the advantages and challenges in providing support for mobile

Indicative Content

Computer architectures and operating systems and their suitability in various business environments, integration of Information Technology, telecommunications and mobile computing in a business environment.

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IT8531 - The Ethics of Data and Artificial

Level	Credits
8	15
Learning Hours	45 directed, 105 self-directed

Aim

To enable students, through careful research and analysis, to identify and manage ethical issues related to the use and advancement of information and communication technology (ICT).

Learning Outcomes

At the end of this course, students will be able to:

1. Critically analyse ethical issues related to digital technologies
2. Critically evaluate and assess normative ethical theories and codes of ethics and apply them to an ethical problem.
3. Research and analyse a current ethical issue related to digital technology and/or artificial intelligence, using critical thinking techniques and recommend solutions within the context of the analysis.

Indicative Content

Introduction to cyber ethics and the ethics of AI, ethical concepts and the normative ethical theories, professional ethics and moral responsibility, privacy in cyberspace, the digital divide, AI and value alignment, autonomous systems and robot ethics, the ethics of algorithms, trust, opacity and machine learning algorithms.

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IT8524 - Internship

Level	Credits
8	30
Learning Hours	95 directed, 205 self-directed

Aim

To gain industry experience relevant to a chosen area of IT and to critically reflect on concepts and perspectives studied.

Learning Outcomes

At the end of this course, students will be able to:

1. Critically assess work practices in a field of IT by integrating advanced concepts, theories and research relevant to a field of IT
2. Identify a problem relevant to the chosen organisation and integrate theories and research evidence to recommend strategies for solving the problem
3. Document and present recommended strategies as appropriate to a selected audience

Indicative Content

- Application of taught knowledge, research evidence and skills to a practical context Assessment of work practices based on theoretical frameworks
- Problem identification and recommendation of strategies.

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IT8502 - Research Proposal

Level	Credits
8	15
Pre-requisites	IT8501 Research in Information Technology
Learning Hours	45 directed, 105 self-directed
-	Elective

Aim

To provide students with knowledge and skills in conducting literature reviews, preparing research proposals and addressing ethical issues.

Learning Outcomes

At the end of this course, students will be able to:

1. Conduct a literature review in a selected ICT research area.
2. Evaluate the strengths and weaknesses of data collection and analysis methods commonly used in ICT research.
3. Identify and evaluate ethical issues in ICT research and develop strategies for minimising harm.
4. Develop a proposal for an ICT research project, including an application for ethical approval.

Indicative Content

Literature searches, criteria for critical review, acknowledging sources, data collection and analysis methods, institutional requirements for approval of research, the structure of research proposals, addressing ethical issues.

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IT8526 - Advanced Project Management for Information Technology

Level	Credits
8	15
Learning Hours	45 directed, 105 self-directed
Status	Compulsory for Postgraduate Diploma in Information Technology. Elective for the Postgraduate Certificate and the Master of Information Technology

Aim

To enable students to evaluate appropriate project management methodology and to develop an appropriate project management process for complex IT projects.

Learning Outcomes

At the end of this course, students will be able to:

1. Research and evaluate current trends in IT project management methodologies and understand their implications for practice.
2. Create a project management plan for an IT project.
3. Implement a project management methodology for an IT project.

Indicative Content:

- Traditional and current project management philosophy, research and practice. Current guidelines of the PMBoK (Project Management Body of Knowledge).
- Project management techniques, which may include critical path analysis, Gantt chart, PERT, critical chain, feasibility analysis.

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IT8528 - Cybersecurity

Level	Credits
8	15
Learning Hours	45 directed, 105 self-directed
Status	Elective

Aim

Provide in-depth knowledge of secure information within contemporary business, including data security, infrastructure security, application security, and the design requirements of secure data and applications.

Learning Outcomes

At the end of this course, students will be able to:

1. Critically evaluate principles and applications of cybersecurity in contemporary business environments.
2. Research, evaluate, and apply mechanisms to mitigate critical cybersecurity threats and vulnerabilities in contemporary business, with a focus on data security, infrastructure security, application security, and design requirements.
3. Research, design and deploy real-world applications of cybersecurity in contemporary business environments.

Indicative Content

Security environment, Security technology and principles, Infrastructure security and risk assessment, Application security and awareness, Systems, software and web security, Trusted computing and multilevel security.

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IT8529 - Blockchain and

Level	Credits
8	15
Learning Hours	45 directed, 105 self-directed
Status	Elective

Aim

To enable students to understand and apply the underlying principles of cryptocurrency and Blockchain technology. Students will be able to research various issues and evaluate different methods of developing a Blockchain-enabled application.

Learning Outcomes

1. Critically analyse the background and underlying principles of the major concepts of Blockchain and cryptocurrency.
2. Research and critically evaluate aspects of the consensus, scalability, and security of Blockchain, and design an appropriate Blockchain-enabled technological solution.
3. Critically assess the business, technical and social implications of Blockchain technology.

Indicative Content

Background; underlying principles, major concepts, business, technical and social implications of cryptocurrency and Blockchain technology. Scalability, consensus and security issues. Smart contracts, distributed applications. Applications of Blockchain.

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IT8532 - Advanced Artificial Intelligence and Machine

Level	Credits
8	15
	A Level 7 qualification in a related field or equivalent industry experience, subject to approval from the Head of School.
Learning Hours	50 directed, 100 self-directed
Status	

This course aims to provide students with a thorough understanding of machine learning and artificial intelligence, with a focus on practical applications and problem-solving in an industry context. Students will develop the ability to critically evaluate AI technologies and design solutions tailored to specific challenges.

Learning Outcomes

At the end of this course, students will be able to:

1. Critically analyse the underlying principles and key concepts of machine learning and AI. Research and critically evaluate advanced AI techniques and their applicability to real-world problems.
2. Assess the technical, business, and social implications of AI solutions in various industry sectors.
3. Design and implement appropriate AI-based solutions to unstructured, complex problems using relevant tools and techniques.

Indicative Content

Key machine learning algorithms and their applications, Data processing, model training, and implementation in Python, TensorFlow, and OpenCV, Developing AI models to solve industry-related challenges, Ethical considerations in AI, including fairness, transparency, and social impact.

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IT9501 - Applied Research Project

Level	Credits
9	45
	Minimum grade of B in IT8501 (Research in IT) AND IT8502 (Research Proposal) **Learning Hours** 50 directed, 400 self-directed
Status	Elective

Aim

To enable students to undertake professional and applied research that contributes to professional practice in information and communications technology.

Learning Outcomes

At the end of this course, students will be able to:

1. Identify a suitable applied research problem in a selected ICT area.
2. Search the research and professional literature to identify and evaluate possible methods for solving the problem.
3. Select and justify an appropriate method for solving the problem.
4. Apply the identified method, evaluate results and make appropriate recommendations.
5. Prepare a project report that meets required presentation standards.

Indicative Content

Selecting a suitable problem and method of solution, evaluating results and making recommendations, institutional standards for presenting project reports.

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IT9502 - Thesis

Level	Credits
9	90
	Minimum grade of B in IT8501 (Research in IT) AND IT8502 (Research Proposal)
Learning Hours	50 directed, 850 self-directed
Status	Elective

Aim

To enable students to plan, execute and complete publishable applied research that contributes to the knowledge base in information and communications technology.

Learning Outcomes

At the end of this course, students will be able to:

1. Conduct a thorough literature review in a selected applied IT research area and identify suitable research question(s).
2. Justify data collection and analysis methods chosen for answering research question(s). Collect and critically analyse data and draw valid conclusions.
3. Demonstrate independent thought in interpreting and discussing research findings.
4. Apply professional editorial standards to a body of written work.

Indicative Content

Literature review, data collection and analysis, drawing conclusions and making recommendations, institutional standards for presenting theses.

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IT9503 - Advanced Information Management and IT Solutions

Level	Credits
9	15

Pre-requisites	Information Systems in Management or equivalent knowledge.
Learning hours	Total hours 150 (tutor-directed 50, self-directed 100)
Status	Elective

Aim

This course provides students with advanced expertise in integrating Information Management (IM) with Information Technology (IT) to drive strategic decision-making and competitive advantage in organisations. Students will critically evaluate, design, and implement IT solutions that address information management challenges, with a strong focus on global trends, ethical considerations, and governance. This course prepares students for leadership roles in managing organisational information as a strategic asset.

Learning Outcomes

By the end of this course, students will be able to:

1. Critically evaluate information management strategies and align them with the broader organisational goals to foster sustainable competitive advantage.
2. Design and implement innovative IT solutions that improve information management processes and drive business performance.
3. Analyse and optimise organisational decision-making and operational efficiency through the integration of advanced IT solutions and information management strategies.
4. Critically assess emerging global trends, ethical issues, and governance frameworks in IT and information management, and their impact on organisational stakeholders.

Indicative Content

Strategic alignment of information management with business goals using IT, Advanced IT solutions for managing and optimising enterprise data, Information governance, security, and risk management practices, Ethical, legal, and compliance considerations in IT-driven information systems, Leadership and change management in implementing IT solutions, Enhancing business intelligence and decision-making through IT-driven strategies.

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IT9504 - Leadership in IT and Digital Organisations

Level	Credits
9	15
	A Level 7 qualification in a related field or equivalent industry experience, subject to approval from the Head of School.
Learning Hours	50 directed, 100 self-directed
Status	

Learning Outcomes

This course equips students with advanced leadership skills relevant to IT and digital organisations. It focuses on digital transformation, strategic decision-making, and managing complex teams in dynamic technology-driven environments. Learners will explore leadership strategies that foster innovation and ethical leadership in IT settings.

Learning Outcomes

At the end of this course, students will be able to:

1. Analyse leadership models and their relevance in the context of IT and digital organisations.
2. Evaluate the role of leadership in driving digital transformation and innovation.
3. Create strategic leadership plans that address cultural, ethical, and technological challenges in digital organisations.
4. Apply leadership strategies to improve collaboration, conflict resolution, and decision-making in IT teams.
5. Reflect on personal leadership styles and evaluate their effectiveness in leading digital teams.

Indicative Content

Leadership models in IT, Digital transformation leadership, Strategic IT leadership, Ethical and cultural leadership, Personal leadership development.

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IT9505 - Advanced Innovation and Design Thinking for IT

Level	Credits
9	15
Pre-requisites	Nil
Learning Hours	45 directed, 105 self-directed

Aim

This course aims to provide advanced critical thinking and practical skills to evaluate and apply innovation strategies and design thinking processes within IT. Students will critically assess the strategic role of innovation and design thinking, leading to creative IT solutions.

Learning Outcomes

At the end of this course, students will be able to:

1. Critically evaluate concepts, theories, and techniques of innovation in IT.
2. Analyse and compare costs and benefits of innovation strategies.
3. Critique methodologies and applications of design thinking.
4. Design and develop innovative IT solutions using design thinking.

Indicative Content

Overview of innovation in IT and innovation management, Strategic business cases for innovation in IT, Innovation during disruptive change, Leading growth and innovation through design thinking, Tools, methodologies, and processes of design thinking, Application of design thinking to IT development.

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IT9506 - Integrated Industry Project

Level	Credits
9	30
Pre-requisites	IT8501 - Research in IT, IT8526 – Advanced Project Management for IT
Learning hours	Total hours 300 (tutor-directed 30, self-directed 270)
Status	Elective

Aim

The Industry Integrated Project enables students to apply and further develop their knowledge and skills by addressing real-world problems or issues within the industry. Through independent learning and critical thinking, students will design practical solutions and engage in project management, fostering professional growth and employability.

Learning outcomes

By the end of this course the student will be able to:

1. Develop and justify a comprehensive project proposal for an industry integrated IT project
2. Analyse and synthesise knowledge from various IT disciplines to implement an industry integrated project
3. Critically reflect on the process and outcomes of an industry integrated IT project
4. Effectively communicate the project findings to diverse audiences

Indicative Content

Project proposal development, project planning and management, integration of IT disciplines, research and problem-solving, progress reporting and documentation, critical reflection and evaluation, presentation and communication.

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