2023 IT PROGRAMME HANDBOOK

School of Innovation, Design and Technology

List of programmes included in this handbook

- NZ Certificate in IT Essentials – Level 4
- NZ Diploma in Information Technology Technical Support – Level 5
- NZ Diploma in Information Systems – Level 5
- Bachelor of Information Technology – Level 7
- Graduate Diploma in Information Technology – Level 7
- Graduate Diploma in Cybersecurity – Level 7
- Graduate Certificate in Cybersecurity – Level 7
- Postgraduate Diploma in Information Technology – Level 8
- Postgraduate Certificate in Information Technology – Level 8
- Master of Information Technology – Level 9

Available on the Programme site on Moodle

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School Welcome

Head of School

Greetings, Tena koutou katoa, Talofa lava, Malo e lelei, Kia Orana, Taloha ni, Fakalofa lahi atu, Bula Vinaka, Ni hao, Namaste, Konnichiwa.

We are thrilled to welcome our new students to the Whitireia and WelTec community. To those returning to campus, welcome back!

You have chosen an exciting, dynamic, and constantly developing field of study. As you know, Information Technology is everywhere and in everything we do. We are excited to see where your study takes you.

Our qualifications are practical, focused, and designed to deliver work-ready graduates through hands-on learning. Employers have identified the most important workplace skills as communication, business knowledge, and the ability to anticipate change. Our qualifications provide these professional skills along with excellent technical skills.

One of the first things you will discover is that the staff of the School of Innovation Design and Technology, and Whitireia and WelTec as a whole, are here for the same reason: we care about your education. We know that transitioning to tertiary education can be both exciting and stressful. Change can be hard, but it also offers opportunities. We are committed to supporting your learning, growth, and success at Whitireia and WelTec. We have many support options available to you.

This Handbook has been designed to provide you with information about our Information Technology programmes. Read over it, and if you have any questions, please get in touch with your tutor or programme manager. The Whitireia and WelTec Student Guide is available online, this details more general polytechnic policies and procedures.

Good luck with your studies and enjoy your stay with us. I look forward to seeing you at graduation!

Mā te kimi ka kite, Mā te kite ka mōhio, Mā te mōhio ka mārama

Seek and discover. Discover and know. Know and become enlightened.

Nau mai, haere mai, tauti mai!

Mary-Claire Proctor

Head of School

School of Innovation, Design and Technology

Use of Handbook

This Programme handbook provides important information about your programme of study this year. It outlines what you can expect to achieve and regulations that you need to know about.

The **Student Guide** provides more information about the services that are available at Whitireia and WelTec to help you succeed in your studies. It refers you to policies and procedures that apply to students and is available on our Te Pūkenga website see link:

https://www.whitireiaweltec.ac.nz/current-students/student-guide/ .

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Timetables

Timetables are available online from this link: http://timetable.whitireiaweltec.ac.nz/2023/

Trimester One

27 February – 23 June 2023	Classes
07 April (Friday) –10 April (Monday)	Study Break – Easter Monday – 10 April
25 April (Wednesday)	Classes Anzac Day observed – Tuesday, 25 April Queen's Birthday – Monday, 5 June Matariki – Friday, 14 July 2023

Trimester Two

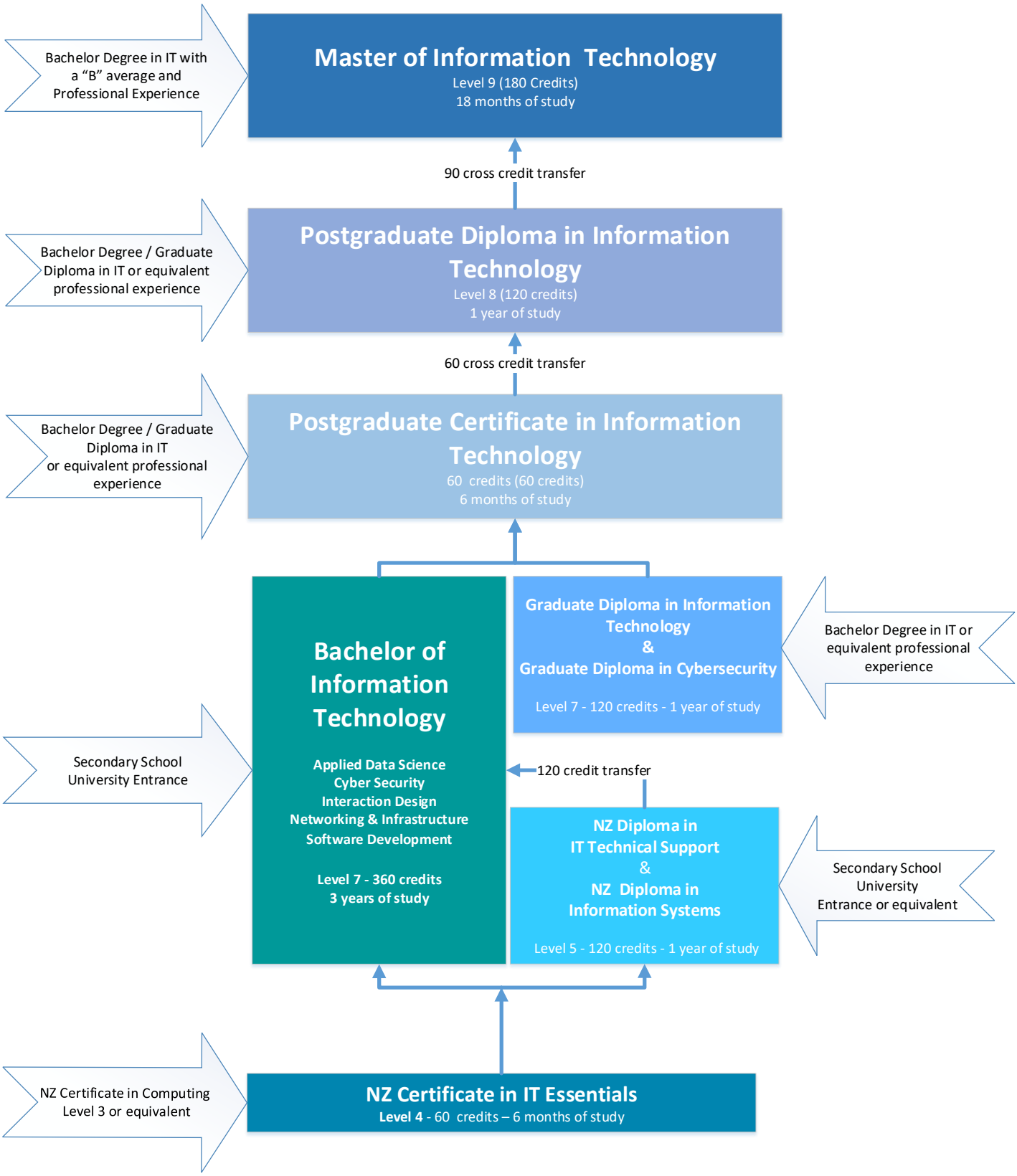
10 July – 3 November 2023	Classes
03 October – 07 October	Study Break
10 October – 18 November	Classes – Labour Day, Monday, 23 October 2023

Whitireia and WelTec 2023 academic year

Week	Starting	Mo	Tu	We	Th	Fr	Sa	Su	Activity	Notes
	26 Dec							1		
1	2 Jan	2	3	4	5	6	7	8	T3 Week 8	Trimester 3 resumes
2	9 Jan	9	10	11	12	13	14	15	T3 Week 9	
3	16 Jan	16	17	18	19	20	21	22	T3 Week 10	
4	23 Jan	23	24	25	26	27	28	29	T3 Week 11	Wgtn Anniversary observed 23 Jan
5	30 Jan	30	31	1	2	3	4	5	T3 Week 12	
6	6 Feb	6	7	8	9	10	11	12	T3 Week 13	Waitangi Day 6 Feb
7	13 Feb	13	14	15	16	17	18	19	T3 Week 14	
8	20 Feb	20	21	22	23	24	25	26	T3 Week 15	Trimester 3 examinations
9	27 Feb	27	28	1	2	3	4	5	T1 Week 1	Trimester 1 starts 27 Feb
10	6 Mar	6	7	8	9	10	11	12	T1 Week 2	
11	13 Mar	13	14	15	16	17	18	19	T1 Week 3	
12	20 Mar	20	21	22	23	24	25	26	T1 Week 4	
13	27 Mar	27	28	29	30	31	1	2	T1 Week 5	
14	3 Apr	3	4	5	6	7	8	9	T1 Week 6	Good Friday 7 April
15	10 Apr	10	11	12	13	14	15	16	T1 Week 7	Easter Monday 10 April
16	17 Apr	17	18	19	20	21	22	23	T1 Week 8	
17	24 Apr	24	25	26	27	28	29	30	T1 Week 9	Anzac Day 25 April
18	1 May	1	2	3	4	5	6	7	T1 Week 10	
19	8 May	8	9	10	11	12	13	14	T1 Week 11	
20	15 May	15	16	17	18	19	20	21	T1 Week 12	
21	22 May	22	23	24	25	26	27	28	T1 Week 13	
22	29 May	29	30	31	1	2	3	4	T1 Week 14	
23	5 Jun	5	6	7	8	9	10	11	T1 Week 15	King's Birthday observed on 5 June
24	12 Jun	12	13	14	15	16	17	18	T1 Week 16	
25	19 Jun	19	20	21	22	23	24	25	T1 Week 17	Trimester 1 examinations
26	26 Jun	26	27	28	29	30	1	2		Mid-year break
27	3 Jul	3	4	5	6	7	8	9		Mid-year break
28	10 Jul	10	11	12	13	14	15	16	T2 Week 1	Trimester 2 starts / Matariki
29	17 Jul	17	18	19	20	21	22	23	T2 Week 2	
30	24 Jul	24	25	26	27	28	29	30	T2 Week 3	
31	31 Jul	31	1	2	3	4	5	6	T2 Week 4	
32	7 Aug	7	8	9	10	11	12	13	T2 Week 5	
33	14 Aug	14	15	16	17	18	19	20	T2 Week 6	
34	21 Aug	21	22	23	24	25	26	27	T2 Week 7	
35	28 Aug	28	29	30	31	1	2	3	T2 Week 8	
36	4 Sep	4	5	6	7	8	9	10	T2 Week 9	
37	11 Sep	11	12	13	14	15	16	17	T2 Week 10	
38	18 Sep	18	19	20	21	22	23	24	T2 Week 11	
39	25 Sep	25	26	27	28	29	30	1	T2 Week 12	
40	2 Oct	2	3	4	5	6	7	8	T2 Week 13	
41	9 Oct	9	10	11	12	13	14	15	T2 Week 14	
42	16 Oct	16	17	18	19	20	21	22	T2 Week 15	
43	23 Oct	23	24	25	26	27	28	29	T2 Week 16	Labour Day 23 Oct
44	30 Oct	30	31	1	2	3	4	5	T2 Week 17	Trimester 2 examinations
45	6 Nov	6	7	8	9	10	11	12	T3 Week 1	Trimester 3 starts 6 November
46	13 Nov	13	14	15	16	17	18	19	T3 Week 2	
47	20 Nov	20	21	22	23	24	25	26	T3 Week 3	
48	27 Nov	27	28	29	30	1	2	3	T3 Week 4	
49	4 Dec	4	5	6	7	8	9	10	T3 Week 5	
50	11 Dec	11	12	13	14	15	16	17	T3 Week 6	
51	18 Dec	18	19	20	21	22	23	24	T3 Week 7	
52	25 Dec	25	26	27	28	29	30	31		Christmas - New Year break

IT Pathways at Whitireia and WelTec

The following diagram provides an overall pathway for programmes offered at the School Innovation, Design and Technology at the WelTec and Whitireia campuses:



NZ Certificate in Information Technology Essentials (Level 4)

Programme Code: NZ2594

Programme Aim

The aim of this programme is to provide learners with industry relevant transferable skills and knowledge across a range of disciplines within Information Technology (IT).

- Learners in this programme have opportunities to:
- Practice and develop skills relevant to specific disciplines within IT, including, information systems, user experience and interface design, computer networks, databases, and software development in a safe learning environment.
- Learn in a safe and supportive environment to address individual learning needs and develop personally.
- Develop the necessary skills to be able to successfully study at a higher level in the future.
- Develop skills to communicate clearly and professionally in a range of contexts within the IT industry.
- Select and apply appropriate professional, ethical, and legal principles as well as practices.

Education Pathways

The qualification provides a pathway into further study to become an IT professional. Graduates may progress to:

- New Zealand Diploma in Information Technology Technical Support (Level 5)
- New Zealand Diploma in Information Systems (Level 5)
- Bachelor of Information Technology (Level 7)

Employment Pathways

The intention of this qualification is primarily to provide a pathway to further IT study.

Graduates of this certificate will have the transferable skills and knowledge to work in a range of entry-level support roles in an organisation, which may include business support or retail roles, and some roles in the IT profession under broad guidance.

Programme Outline & Structure

New Zealand Certificate in Information Technology Essentials is a 17 weeks (Full time) programme with four courses. Each paper in the New Zealand Certificate in Information Technology (Essentials) is worth 15 credits and requires approximately 150 learning hours for 15 credits. The four compulsory courses provide:

- **Fundamentals of Information Technology Infrastructure**
  Computer hardware, operating systems, applications, networks, storage, and security. Professional and ethical principles and practices relating to IT infrastructure.
- **Fundamentals of User Experience and Interface Design**
  User Experience (UX) and User Interface (UI) design, business concepts, interactive digital media. Ethical considerations when creating interactive digital media. Communication skills while managing a project.
- **Fundamentals of Software Development**
  Concepts of software development.
- **Fundamentals of Information Systems**
  Relational database. Knowledge and concepts of organisational information systems requirements. Ethics and legality to comply with the requirements of an IT organization. Project management tools and methodologies. Communication and collaboration.

Entry to Programmes

Academic
NZ Certificate in Computer Intermediate User Level 3 (Ref 2592) or equivalent knowledge, skills or experience.

International Students
IELTS 5.5 (Academic) with no band score lower than 5 or equivalent.

Special Entry
An applicant who does not meet all entry requirements may be granted admission where the Head of School responsible for the programme is satisfied the applicant is capable of undertaking the programme.

Award of Qualification

Students must successfully complete all four compulsory courses to be awarded the New Zealand Certificate in Information Technology Essentials (Level 4).

Course Code	Course Title	Level	Credits	Compulsory or Elective
IT4104	Fundamentals of Information Technology Infrastructure	4	15	Compulsory
IT4105	Fundamentals of User Experience and Interface Design			
IT4106	Fundamentals of Information Systems			
IT4107	Fundamentals of Software Development			

See Appendix A for Course Descriptors

New Zealand Diploma in Information Technology Technical Support (Level 5)

Programme Aim

The aim of this programme, NZ Diploma in IT Technical Support (Level 5), is to prepare students for working in a range of entry level roles in the Information Technology (IT) industry, and to prepare students for further study that will equip them to work in the field of IT as a profession.

Education Pathways

This qualification provides a pathway to the range of IT as a profession qualification. These include:

- New Zealand Diploma in Web Development and Design (Level 5) [Ref: 2598]
- New Zealand Diploma in Software Development (Level 6) [Ref: 2604]
- HV4395 Bachelor of Information Technology (Level 7).

Other pathways may include undergraduate degree qualifications.

This qualification may also equip learners to undertake optional industry certifications at the appropriate level, as a starting point for a career in IT. This qualification provides an education pathway from:

- NCEA Level 2 or 3, with appropriate credits in mathematics and digital technologies subjects
- New Zealand Certificate in Computing (Intermediate User) (Level 3) [Ref: 2592]
- New Zealand Certificate in Computing (Advanced User) (Level 4) [Ref: 2593]
- New Zealand Certificate in Information Technology Essentials (Level 4) [Ref: 2594]

Employment Pathways

Graduates of these qualifications will have the skills and knowledge to work in the IT industry in a range of entry-level roles. The scope of the qualification outcomes matches requirements for IT support roles at Tier 1.

Programme Outline & Structure

New Zealand Diploma in Information Technology Technical Support is a 120 credit programme, divided into eight 15 credit courses.

Each course is compulsory and needs to be successfully completed in order to gain the qualification NZ2596 New Zealand Diploma in Information Technology (Technical Support) (Level 5).

The courses are designed to follow on from a Level 4 Certificate extending IT skills and developing skills required in the IT industry.

Learning outcomes and content have been written so learners develop the skills to maintain modern technologies. Legislative requirements are also integrated into the learning.

Course	Status	Title	Prerequisites	Credits
IT5115	Compulsory	IT System Overview	None	15
IT5116	Compulsory	Database Administration	None	15
IT5117	Compulsory	Hardware Servicing	None	15
IT5118	Compulsory	Professional Practice	None	15
IT5119	Compulsory	IT Technical Support	IT5115	15
IT5120	Compulsory	Server Management	IT5117	15
IT5121	Compulsory	Fundamentals of Programming and Problem Solving	None	15
IT5122	Compulsory	Implementing Networks	None	15

Entry to Programmes

Academic

Learner's enrolling are recommended to hold one of the following qualifications, or equivalent knowledge, skills and experience.

- NCEA Level 2 or 3 including Level 1 Literacy and Numeracy
- New Zealand Certificate in Computing (Intermediate User) (Level 3) [Ref: 2592]
- New Zealand Certificate in Computing (Advanced User) (Level 4) [Ref: 2593]
- New Zealand Certificate in Information Technology Essentials (Level 4) [Ref: 2594]
- New Zealand Certificate in Information Technology (Level 5) [Ref: 2595]

English Language (for international students)

IELTS score of 5.5 (no band lower than 5.5) or equivalent

Or

Achieved the academic entry requirements in New Zealand or at an institution where English was the language of tuition and assessment

Special Entry

An applicant who does not meet all entry requirements may be granted entry where the Head of School responsible for the programme is satisfied the applicant is capable of undertaking the programme.

Award of Qualification

Students must pass eight compulsory courses to be awarded the New Zealand Diploma in Information Technology (Technical Support) (Level 5).

See Appendix B for Course Descriptors

NZ Diploma in Information Systems (Level 5)

Programme code: NZ2597

Programme Aim

The purpose of this programme is to enable students to develop skills to design and create programs, websites, networks and databases. This programme builds on the Whitireia New Zealand Certificate in Information Technology (Level 5), focusing on Information Systems skills, practices, and tools. This programme encompasses the qualifications' core skills, core technical skills and soft skills, as an integral part of the compulsory courses utilising a holistic approach. The matrix in Appendix B indicates how these are embedded within the programme. This programme provides stair-casing into New Zealand Diploma in Information Systems (Level 6) or into the Bachelor of Information Technology at Whitireia.

Education Pathways

The qualification provides a pathway to an Information Systems or Information Technology qualification. This may include:

- The 2nd year of Bachelor of Information Technology at WelTec and Whitireia
- Other possible pathways include under-graduate degree qualifications. This qualification may also equip learners to attempt optional industry certifications at the appropriate level and area of specialty.

Employment Pathways

Graduates of this diploma will have the skills and knowledge to gain employment in roles such as process mapping, project administration, records management, entry-level application administration, and other entry level IS roles.

Programme Outline & Structure

New Zealand Diploma in Information Systems (Level 5) is a one-year (Full time) programme with eight courses. Each paper in the Diploma in Information Systems programme is worth 15 credits and requires approximately 150 learning hours for 15 credits. The courses include a broad understanding of data models and databases, software design and development, systems analysis and design, programming skills, developing and maintaining applications, concepts of discrete mathematics, networking and data communications principles, evolution and implementation of operating systems, professional legal and ethical issues, the information technology industry in New Zealand, and effective communication in an information technology context.

Entry to Programmes

- Whitireia degree entry requirements or equivalent qualification/work experience
- International: IELTS 6.0 (no band score lower than 5.5); or equivalent.

Award of Qualification

Students must successfully achieve all eight compulsory courses to be awarded the New Zealand Diploma in Information Systems (Level 5) qualification.

See Appendix C for Course Descriptors.

Graduate Diploma in Information Technology (Level 7)

Programme Aim

The Graduate Diploma in Information Technology is a one year programme run in conjunction with the Bachelor of Information Technology for those who have already studied at a degree level to formalise recognition of specialist information and communication technology ability and skills. The main subject areas include internet applications, systems design, software development, internet application development, information systems, data models and databases.

Education Pathways

Graduates from the Graduate Diploma in Information Technology can progress to study towards the Postgraduate Certificate in Information Technology, Postgraduate Diploma in Information Technology or Master of Information Technology at Whitireia and WelTec or other similar programmes at tertiary organisations within New Zealand and internationally.

The Graduate Diploma in Information Technology is part of a group of programmes designed to staircase learners from Level 2 study to Masters Study. This supports learners to enter IT study at the level that suits their background and provides a clear pathway for their progression through learning.

Employment Pathways

Graduates of the Graduate Diploma in Information Technology have detailed knowledge and skills in selected areas of IT for employment as an IT professional. Opportunities within the IT industry include employment in public organisations, private companies, IT enterprises, self-employment, and teaching.

Depending on the course set chosen by students, graduate opportunities include:

Software Development

Full stack developer, web developer, analyst programmer, AI application developer, system test analyst / engineer, business analyst, net developer, software developer, mobile application developer, game developer, software engineer, system and software tester.

Data Science

Data scientist, business intelligence analyst, data management and analytics, database developer, marketing data analytics, systems analyst, business analyst, data warehouse developer, Business Intelligence reporting analyst, social media analytics, data analyst and reporting analyst.

Cyber Security

Security analyst, security administrator, incident responder, information assurance analyst, security assessor/auditor, penetration tester, digital forensic technician/analyst, or other information/cybersecurity-related roles, including support roles such as service desk.

Networking and Infrastructure

Network engineer, systems engineer, systems engineer/cloud support, ICT support technician, cloud network engineer, infrastructure engineer, network support, network administrator, or service desk support.

Programme Outline & Structure

Graduate Diploma in Information Technology (Level 7) PR5011/HV4709 is a one-year (Full time) programme (120 credits). Each paper in the Graduate Diploma in Information Technology programme is worth 15 or 30 or 45 credits, and requires approximately 150 to 450 learning hours.

- IT6502 Project Management and IT7510 Capstone Project are compulsory courses, to a total of 60 credits
- Students must complete 75 credits at level 7, with a further 45 credits at level 5, 6 or 7

The structure of the GDipIT enables a learner to undertake study in a specialised area, leading to substantial applied project work at level 7. Students select courses based on their desired pathway and with guidance from programme staff.

An elective course is any course chosen from the BIT schedule of courses or the Graduate Diploma in Information Assurance and Security (or successor thereof) schedule of courses.

Unspecified Credits can be used only for credit recognition of a course that was completed as part of a different programme and where the course content is related to IT but not directly equivalent to a course in this programme.

- Pre-requisites may be waived by the Head of School where students demonstrate pre-requisite knowledge in the courses to be undertaken. Otherwise, students may be required to enrol in stated pre-requisite courses.
- Not all electives will be offered every year or at every campus. A list of available elective courses for the year will be available to learners on enrolment.

Entry to Programmes

- Bachelor's degree in a relevant discipline or equivalent practical, professional or educational experience

  An applicant with a bachelor's degree in an unrelated discipline may be granted entry at the discretion of the Programme Manager where it is considered that the applicant has a reasonable chance of succeeding in the qualification

- **International Students - English Language Requirements**:

  All applicants must have a level of English sufficient to be able to study at this level. Those learners whose first language is not English should have:

  - An international English Language Testing System (IELTS) overall academic score of at least 6.0 (with at least 5.5 in each band) issued within the last two years, or equivalent.

Award of Qualification

To be awarded the Graduate Diploma in Information Technology Students must successfully complete 120 credits of study including:

- 75 credits at level 7
- 45 credits at level 5-7
- The two compulsory courses: IT7510 Capstone Project and IT6502 Project Management

See Appendix D for Course Descriptors for both Bachelor and Graduate Diploma in IT.

Graduate Certificate in Cybersecurity (Level 7)

Programme Aim

The aim of the Graduate Certificate in Cybersecurity (GCertCS) is to create a set of information technology professionals who have the ability to think about information security and assurance within an enterprise system, and know how to integrate security policy, practices and technologies into an operational infrastructure.

Education Pathways

Graduates from the GCertCS can progress to study towards the Graduate Diploma in Cybersecurity, Postgraduate Certificate in Information Technology, Postgraduate Diploma in Information Technology or Master of Information Technology at Whitireia and WelTec or other similar programmes at tertiary organisations within New Zealand and internationally.

The GCertCS is part of a group of programmes designed to staircase learners from Level 2 study to Masters level study. This supports learners to enter IT study at the level that suits their background and provides a clear pathway for their progression through learning.

Employment Pathways

Graduates will have the skills and knowledge to work in the IT industry in a range of roles such as security consultant, security analyst, security administrator, SecDevOps/DevSecOps, incident analyst, incident handler, information assurance analyst, security assessor/auditor, security engineer, penetration tester, digital forensic analyst, network forensic analyst, malware analyst, security developer or other information/cyber security-related support roles e.g. service desk.

Programme Outline & Structure

Graduate Certificate in Cybersecurity (Level 7) HV4708 is a 60 credit programme, divided into four 15 credit courses. There are two compulsory courses and two electives.

Students must complete 60 credits at level 7 consisting of:

- CS7501 Information Security III and IT7502 Digital Ethics
- Two elective courses at level 7 chosen from the course list below

Course Code	Course Title	Level	Credit	Compulsory or Elective
CS7501	Information Security III	7	15	C
IT7502	Digital Ethics	7	15	C
CS7503	Network Fundamentals for Information Assurance and Security	7	15	E
CS7504	Security for DevOps	7	15	E
CS7505	Incident Response and Digital Forensics	7	15	E
IA7307	Cryptography and Security Mechanisms	7	15	E
IA7308	Security Testing and Network Defence	7	15	E
CS7506	Cloud Security	7	15	E

Entry to Programmes

Bachelor degree in Information Technology, Computer Science, or equivalent OR

Bachelor degree in any discipline with a practical, professional or educational experience in the IT industry OR

Equivalent practical, professional or educational experience in the IT industry.

International Students - English Language Requirements:

- An international English Language Testing System (IELTS) overall academic score of at least 6.0 (with at least 5.5 in each band) issued within the last two years, or equivalent.

Award of Qualification

To be awarded the Graduate Certificate in Cybersecurity (Level 7) students must successfully complete 60 credits at level 7 consisting of:

- The compulsory courses CS7501 Information Security III and IT7502 Digital Ethics
- 30 further credits at level 7

See Appendix E for Course Descriptors.

Graduate Diploma in Cybersecurity (Level 7)

(Programme Code: HV4707)

Programme Aim

The aim of the Graduate Diploma in Cybersecurity (GDipCS) is to create a set of information technology professionals who have the ability to think about information security and assurance within an enterprise system, and know how to integrate security policy, practices and technologies into an operational infrastructure.

In addition, the Graduate Diploma in Cybersecurity will:

- equip information technology professionals to recognise and competently assess cyber threats and undertake incident response and digital forensic-related activities
- give information technology professionals the technical skills to conduct security tests against networks and business skills necessary for providing justification, efficiency and an understanding of contemporary business and security needs.

Education Pathways

Graduates from the GDipCS can progress to study towards the Postgraduate Certificate in Information Technology, Postgraduate Diploma in Information Technology or Master of Information Technology at Whitireia and WelTec or other similar programmes at tertiary organisations within New Zealand and internationally.

The GDipCS is part of a group of programmes designed to staircase learners from Level 2 study to Masters level study. This supports learners to enter IT study at the level that suits their background and provides a clear pathway for their progression through learning.

Employment Pathways

Graduates of these qualifications will have the skills and knowledge to work in the IT industry in a range of roles such as security consultant, security analyst, security administrator, SecDevOps/DevSecOps, incident analyst, incident handler, information assurance analyst, security assessor/auditor, security engineer, penetration tester, digital forensic analyst, network forensic analyst, malware analyst, security developer or other information/cyber security-related support roles e.g. service desk.

Programme Outline & Structure

Graduate Diploma in Cybersecurity (Level 7) HV4707 is a 120 credit programme, divided into eight 15 credit courses. There are two compulsory courses and thirteen electives. At least five courses at level 7 (including CS7501 and IT7502) and three other courses at levels 5, 6 or 7 must be successfully completed in order to gain the qualification Graduate Diploma in Cybersecurity (Level 7).

Entry to Programmes

Bachelor degree in Information Technology, Computer Science, or equivalent OR

Bachelor degree in any discipline with a practical, professional or educational experience in the IT industry OR
Equivalent practical, professional or educational experience in the IT industry.

International Students - English Language Requirements:
An international English Language Testing System (IELTS) overall academic score of at least 6.0 (with at least 5.5 in each band) issued within the last two years, or equivalent.

Award of Qualification

To be awarded the Graduate Diploma in Cybersecurity students must successfully complete 120 credits consisting of:

- A minimum of 75 credits at Level 7 which includes compulsory courses CS7501 Information Security III and IT7502 Digital Ethics and a further 45 credits at level 5, 6 or.

Bachelor of Information Technology (Level 7)

Programme code: PR5006/ HV4701

Programme Aim

The aim of the Bachelor of Information Technology (BIT) is to prepare graduates for meaningful careers in the Information Technology (IT) industry. On completion of the BIT, a graduate will have a solid understanding of the fundamental principles and theory of Information Technology, a familiarity with information technologies commonly used in organisations, and the ability to learn new skills in a rapidly changing environment. This three-year degree is designed to provide graduates with both the ability to pursue a professional career in the Information Technology industry and the academic base required for higher studies.

The programme builds learners' expertise in the IT discipline, developing professional competencies, critical thinking and problem solving, and collaboration and communication capabilities, which they can then apply to roles in the IT profession. The degree prepares learners to participate in and contribute to the economic, social and cultural life of society, whether in New Zealand or internationally. The programme facilitates multi-disciplinary, work-focused projects through links forged with the IT industry.

This qualification provides a forward-looking, versatile programme of study for learners who wish to enter the IT industry, both in New Zealand and globally. Graduates will have the academic base required for further study and the ability to pursue a professional career in the Information Technology industry, particularly in the areas of data science, cyber security, interaction design, software development and networking and infrastructure.
The focus of this qualification is on both theoretical and applied learning, and the development of IT skills and knowledge that are valued both in a range of occupations and professions and in the wider community. The incorporation of industry-focused projects develops both specific skills in a discipline and the transferable skills needed for collaborative and entrepreneurial work.

Education Pathways

Graduates of the Bachelor of Information Technology have detailed knowledge and skills in selected areas of IT for employment as an IT professional. Opportunities within the IT industry include employment in public organisations, private companies, IT enterprises, self-employment, and teaching.

Employment Pathways

Graduates from the Bachelor of Information Technology can progress to study towards the Postgraduate Certificate in Information Technology, Postgraduate Diploma in Information Technology or Master of Information Technology at Whitireia and WelTec or other similar programmes at tertiary organisations within New Zealand and internationally. The Bachelor of Information Technology is part of a group of programmes designed to staircase learners from Level 2 study to Masters Study. This support learners to enter IT study at the level that suits their background and provides a clear pathway for their progression through learning.

Programme Outline & Structure

The structure of the degree enables a learner to undertake study in a specialised area, or major, leading to substantial applied project work at level 7. The programme prepares learners with well-developed knowledge, skills and attributes for IT employment. The award of the degree can state the major endorsement:

- Bachelor of Information Technology (Software Development)
- Bachelor of Information Technology (Applied Data Science)
- Bachelor of Information Technology (Cyber Security)
- Bachelor of Information Technology

Students may select a specific major endorsement for their study or may choose to study the unendorsed Bachelor of Information Technology, which has no specified major. To complete the degree, a learner must pass courses worth 360 credits, with a minimum of 90 credits at level 7 and a maximum of 135 credits at level 5. The credits to complete the qualification comprise core compulsory courses, compulsory courses within a major, and elective

courses. An elective course is any course chosen from the BIT schedule of courses or the Graduate Diploma in Information Assurance and Security (or successor thereof) schedule of courses. Elective courses from other degree-level qualifications can be selected on approval from the Programme Manager. Learners from other majors may study a majors' compulsory courses as electives.

The credit value allocation for each year of full-time study is shown in the table below:

Degree with Major

Levels	Core Courses	Major Compulsory	Elective Courses*	Total Credits
Level 5	30	15	75	120
Level 6	30	60	30	120
Level 7	60	30	30	120

*Elective course selection must comprise no more than 90 credits at level 5, with the remainder of elective credit at level 6 and or level 7

Unendorsed degree

Levels	Core Courses	Elective Courses*	Total Credits
Level 5	30	90	120
Level 6	30	90	120
Level 7	60	60	120

*Elective course selection must comprise no more than 105 credits at level 5, with the remainder of elective credit at level 6 and or level 7

Bachelor of Information Technology Structure

Level 5		***CS**: Cyber Security, **ADS**: Applied Data Science, **SD**: Software Development, **UN**: Unendorsed*					
Code	**Title**	**Pre-requisites**	**Credits**	**CS**	**ADS**	**SD**	**UN**
IT5501	Mathematics for IT	None	15	•	•	•	•
IT5502	Communications for IT	None	15	•	•	•	•
IT5504	Information Security I	None	15	•			
IT5507	Fundamentals of Data Science	None	15		•		
IT5503	Programming I	None	15			•	
IT5509	Software Testing Fundamentals	None	15				
IT5510	Introduction to Operating Systems	None	15				
IT5505	Interaction Design Fundamentals	None	15				
IT5506	Introduction to Networking	None	15				
			Compulsory credit	45	45	45	30
			Elective credit	75	75	75	90
			Total credit	**120**	**120**	**120**	**120**

Key

•	Common core compulsory courses
•	Cyber Security (CS) major compulsory courses
•	Applied Data Science (ADS) major compulsory courses
•	Software Development (SD) major compulsory courses
	Elective courses

Level 6							
Code	**Title**	**Pre-requisites**	**Credits**	**CS**	**ADS**	**SD**	**UN**
IT6501	Systems Analysis and Design	IT5507, IT5503	15	•	•	•	•
IT6502	Project Management	IT5502	15	•	•	•	•
CS6501	Information Security II	None	15	•			
CS6502	Linux System Administration	IT5504, IT5506	15	•			
CS6503	Digital Forensics	IT5504, IT5506	15	•			
CS6504	Cryptography & Blockchain	IT5504, IT5506	15	•			
DS6501	Social Data Analytics	IT5507	15		•		
DS6502	Data Analysis and Visualisation	IT5507	15		•		
DS6503	Data Mining Tools and Techniques	IT5507	15		•		
DS6504	Business Intelligence and Big Data	IT5507	15		•		
SD6501	Mobile Application Development	IT5503, IT5507	15			•	
SD6502	Programming II	IT5503	15			•	
SD6503	Testing and Secure Coding	SD6502	15			•	
SD6504	Game Development	IT5501, IT5503	15			•	
NI6503	Unified Infrastructure Services	IT5506	15				
NI6504	Cloud Computing	IT5506	15				
ID6501	Responsive Website Design	IT5503	15				
			Compulsory credit	90	90	90	30
			Elective credit	30	30	30	90
			Total credit	**120**	**120**	**120**	**120**

Level 7							
Code	**Title**	**Pre-requisites**	**Credits**	**CS**	**ADS**	**SD**	**UN**
IT7501	Capstone Project	*	45	•	•	•	•
IT7502	Digital Ethics	IT5502	15	•	•	•	•
CS7501	Information Security III	IT5504, IT5506	15	•			
CS7502	Special Topic in Cyber Security	IT5504, IT5506	15	•			
DS7501	Data Mining for Business Analytics	DS6502	15		•		
DS7502	Data Warehouse Design & Imp	DS6503	15		•		
SD7501	Web Application Development	IT5507, SD6502	15			•	
SD7502	Intelligent Systems Development	IT5501, SD6502	15			•	
ID7502	Human Computer Interaction	IT5505	15				
IT7508	Internship	***	30				
			Compulsory credit	90	90	90	60
			Elective credit	30	30	30	60
			Total credit	**120**	**120**	**120**	**120**
			Total for degree	**360**	**360**	**360**	**360**

Note

* 240 credits at level 5 and above with 1 course at level 7
** Level 6 study as appropriate for the topic
*** Completion of 240 credits at level 5 and above

- An elective may be any course chosen from the BIT schedule of courses or the Graduate Diploma in Information Assurance and Security (or successor thereof) schedule of courses. Elective courses from other degree-level qualifications can be selected on approval from the Programme Manager.
- Not all electives will be offered every year or at every campus. A list of available elective courses for the following three years will be available to learners on enrolment.

Entry to Programmes

Achievement of NCEA Level 3 (60 credits at Level 3 or higher and 20 credits at Level 2 or higher) including:

- A minimum of 14 credits at Level 3 or higher in each of three subjects from the list of approved subjects
- A minimum of 10 credits at Level 2 or higher in English or Te Reo *Māori* made up of:
    - 5 credits in reading
    - 5 credits in writing

  AND
- A minimum of 10 credits at Level 1* or above in Numeracy, made up of: achievement standards – specified achievement standards available through a range of subjects, or unit standards - package of three numeracy unit standards (26623, 26626, 26627- all three required)
  OR
- Any qualification (New Zealand or overseas) recognised by NZQA as being equivalent to the achievement of NCEA Level 3
- A qualification considered to be equivalent to the above

An applicant with equivalent experience, who does not meet all of the entry requirements, may be granted entry at the discretion of the Head of School where it is considered that the applicant has a reasonable chance of succeeding in the qualification.

English Language Requirements:

All applicants must have a level of English sufficient to be able to study at this level. Those learners whose first language is not English should have:

An international English Language Testing System (IELTS) overall academic score of at least 6.0 (with at least 5.5 in each band) issued within the last two years, or equivalent.

Award of Qualification

In order to be awarded the Bachelor of Information Technology, a learner must successfully pass courses to a total of 360 credits, with a minimum of 90 credits at level 7 and a maximum of 135 credits at level 5.

Required Courses		Credits
Compulsory Courses		
IT5501	Mathematics for IT	15
IT5502	Communications for IT	15
IT6501	Systems Analysis and Design	15
IT6502	Project Management	15
IT7502	Digital Ethics	15
IT7501	Capstone Project	45
	Total Compulsory Credit	**120**
Elective Courses		
	Elective course at Level 5-7	105
	Elective courses at Level 6-7	105
	Elective courses at Level 7	30
	Total Elective Credit	**120**
	Total Credit	**360**

See Appendix D for Course Descriptors.

Postgraduate Certificate in Information Technology (Level 8)

Programme Code: PR4963

Programme Aim

The aim of this programme is to enable students to gain internationally recognised skills and knowledge in the area of information technology to assist New Zealand in its drive toward a knowledge-based economy. Graduates will be able to use their enhanced knowledge, skills and capabilities to proceed to further studies or to obtain employment in positions of responsibility that relate to the electives they choose.

Employment Pathways

After graduation (and further work experience in some cases), possible jobs in business, education, government, health, industry or the community sector include Business Analyst, Database Administrator, Network Manager, Information Systems Manager, Security Specialist, Software Developer, Software Tester, Systems Administrator, Systems Analyst, Systems Integrator, and Team Leader. Electives will be chosen to suit the student's likely career path. Graduates will be able to use their enhanced knowledge, skills and capabilities to proceed to further studies (at post-graduate level with some credit recognition) or to obtain positions related to their choice of electives, such as Business Analyst, Database Administrator, Network Manager, Security Specialist, Software Developer, Software Tester, Systems Administrator, Systems Analyst, or Systems Integrator.

Education Pathways

Postgraduate Certificate in Information Technology students will normally have completed all requirements of a relevant Bachelor's Degree or Graduate Certificate or Graduate Diploma, or be deemed to have acquired the relevant skills and knowledge through appropriate work or professional experience, before enrolling in the programme. Graduates of the Postgraduate Certificate in Information Technology wishing to undertake further study may be admitted into master's programmes in New Zealand or overseas, possibly with some credit recognition
Postgraduate Certificate in Information Technology (Level 8) is a one-semester (Full time) programme (60 credits). Each paper in the Postgraduate Certificate in Information Technology is worth 10, 15 or 30 credits and requires approximately 100 to 300 learning hours.

Entry to Programmes

Bachelor's Degree (or Graduate Certificate or Graduate Diploma) in Information Technology or related subject or be deemed to have acquired the relevant skills and knowledge through appropriate work or professional experience

International students require IELTS 6.5 (with no band below 6.0)

Award of Qualification

The Postgraduate Certificate requires a minimum of 60 credits from level 8 (including 8101), and all requirements must be completed within three years of first enrolling.

See Appendix G for Course Descriptors.

Postgraduate Diploma in Information Technology (Level 8)

Programme Code PR4962

Programme Aim

This programme aims to enable students to gain internationally recognised research skills and knowledge in the area of information technology to assist New Zealand in its drive toward a knowledge-based economy. Graduates will be able to use their enhanced knowledge, skills and capabilities to proceed to further studies, research or to obtain employment in positions of responsibility that relate to the electives they choose.

Employment Pathways

After graduation (and further work experience in some cases), possible jobs in business, education, government, health, industry or the community sector include Business Analyst, Database Administrator, Network Manager, Information Systems Manager, Project Manager, Security Specialist, Software Developer, Software Tester, Systems Administrator, Systems Analyst, Systems Integrator, and Team Leader. Electives will be chosen to suit the student's likely career path.

Employment Pathways

Graduates will be able to use their enhanced research knowledge, skills and capabilities to proceed to further studies (usually research qualifications with some credit recognition) or to obtain positions related to their choice of electives, such as Business Analyst, Database Administrator, Network Manager, Project Manager, Security Specialist, Software Developer, Software Tester, Systems Administrator, Systems Analyst, or Systems Integrator.

Programme Outline & Structure

Postgraduate Diploma in Information Technology (Level 8) is a one-year (Full time) programme (120 credits). Each paper in the Postgraduate Diploma in Information Technology is worth 15 or 30 credits and requires approximately 150 or 300 learning hours.

The Postgraduate Diploma in Information Technology has two compulsory papers and a range of electives.

Entry to Programmes

Bachelor's Degree (or Graduate Certificate or Graduate Diploma) in Information Technology or related subject or be deemed to have acquired the relevant skills and knowledge through appropriate work or professional experience.

International students IELTS 6.5 (with no band below 6.0)

Award of Qualification

The Postgraduate Diploma requires a minimum of 120 credits from levels 7 and 8 (including 7325 and 8401), including at least 90 credits from Level 8, and all requirements must be completed within five years of first enrolling.

See Appendix G for Course Descriptors.

Master of Information Technology (Level 9)

Programme Code HV4553

Programme Aim

This programme aims to enable students to gain internationally recognised skills and knowledge in the area of information technology to assist New Zealand in its drive toward a knowledge-based economy. There are two special target groups: domestic students currently working within the sector who will be able to upgrade their qualifications to masterate level while still engaging with the workforce and international students who will be able to gain a masterate qualification to assist either in an application for permanent residence or in obtaining employment in their country of origin.

Graduates of the Master of Information Technology will be able to: critically evaluate research literature in information technology and related disciplines; work effectively in multicultural teams and exercise leadership as required; show evidence of advanced knowledge about an applied field of enquiry; engage in rigorous intellectual analysis, criticism and problem-solving; work independently and appreciate the need for continued learning; demonstrate mastery of sophisticated theoretical subject matter; apply their advanced knowledge and skills to new situations; plan, conduct and report on substantial applied research projects; manage projects involving the use of information technology; assess the impact of information technology on society; communicate effectively (orally, visually and in writing); research, analyse and argue from evidence; identify, analyse and address ethical issues; and undertake further postgraduate study. A graduate who completes a 90 credit thesis will also be able to demonstrate a high order of skill in the planning, execution and completion of a piece of applied research.

Employment Pathways

After graduation (and further work experience in some cases), possible jobs in business, education, government, health, industry or the community sector include Business Analyst, Database Administrator, Information Systems Manager, Network Manager, Security Specialist, Software Developer, Software Tester, Systems Administrator, Systems Analyst, Systems Integrator, and Team Leader. Electives will be chosen to suit the student's likely career path.

Programme Outline & Structure

Master of Information Technology (Level 9) (MIT) is an 18-month full-time programme (180 credits). This programme requires the completion of papers plus a research component. Each paper in the Master of Information Technology is worth 15 or 30 credits and requires approximately 150 or 300 learning hours. There are two options for the research component; one is a 45 credit research report and the other a 90 credit Thesis.

Entry to Programmes

Students will have completed all requirements of a Bachelor's degree (or Graduate Diploma or Postgraduate Diploma) in Information Technology or related subject with at least a B grade average at level 7 (or 8), and be deemed to have acquired additional skills and knowledge through relevant work or professional experience. International students require IELTS 6.5 (with no band below 6.0), or equivalent.
Interviews with individual applicants may be required to evaluate their ability to undertake postgraduate study.

Award of Qualifications

The Master of Information Technology requires successful completion of a minimum of 180 credits from level 8 (including IT8501 and IT8502) and level 9 (either IT9501 or IT9502), and all requirements must be completed within five years of first enrolment.

See Appendix G for Course Descriptors.

Teaching and Learning Methods

Courses are delivered using blended delivery with face-to-face classes on campus supplemented with web-based support. As an applied programme of study, learner learning is generated from classroom presentations, case studies, real life projects, guest speakers and assignments. Assignments offer learners the chance to conduct research, write essays and reports or develop Information Technology components and work closely with their classmates in a team environment. Some assignments are completed in groups.

A certain amount of self-directed learning is required to gain maximum learning and benefit from the programme. Computer labs and software for home computers are available for learners to practise what they are learning and have timetabled workshop time to practise their skills.

Project Work

Projects are used as vehicles for both learning and assessment. Well-designed briefs lead learners into learning situations where they can explore and test possibilities, develop and apply problem-solving and critical thinking capacities, and evaluate the results they produce.

Collaboration is required in project activity, supported by learning about group processes, roles and teamwork, and communication skills. Tutors support learners in their interpretation of briefs and planning, provide for regular progress checks and give formative feedback. The guidance also includes advising learners not to follow a path that would take them too far off track and risk non-completion of a course.

In the third year of the BIT degree, all learners complete 45-credit capstone projects. The capstone project is an industry project. This compulsory course offers learners the opportunity to work with a team of learners on a real project with real clients. This opportunity offers learners a chance to showcase and apply what they have been learning throughout their studies. This is generally carried out as a group project, but there is an allowance for an individual project to be carried out on approval from the Programme Manager.

The capstone project is carried out in an area related to the major that the student is enrolled on. For those students who have elected to study an unendorsed BIT, the project will be focussed on an area where the student has completed learning to level 7.

An academic supervisor with expertise in a relevant field supports each team; for example, websites, databases, networks, programming. Additional expertise may be called upon from within the school. A project coordinator is assigned to develop and maintain relationships with clients and manage the process for learners and the academic supervisor. The Capstone Project Handbook contains the information required by the learner about the project process.

Research Projects and Thesis

Students enrolled in the Master of IT must complete a 45-credit (IT9501) Applied Research project or a 90-credit (IT9502) thesis. IT9501 and IT9502 Will be supervised by two academic staff members appointed by the Postgraduate Board of Studies on the recommendation of the Programme Manager. The primary supervisor will have a level 10 qualification and have supervised a level 9 or 10 research project or thesis to successful completion. The secondary supervisor will have a level 9 or 10 qualification. Students will have regular supervision sessions with their supervisor/s, according to the Academic Supervision Procedures. The Research Policy applies to all student research that is carried out as part of a programme of study. Student intellectual property is addressed in the Intellectual Property Procedures.

Assessments

Assessment methods and grading

This programme uses achievement-based assessments.

- Individual assessments may cover one or more of the learning outcomes.
- The result for each assessment is given as a mark.
- Each summative assessment is assigned a percentage weighting.
- The overall percentage mark for the course is calculated by adding the weighted results for all summative assessments.

A range of assessment methods may be used. The following are examples of appropriate methods of assessment:

Test

A test is a controlled written, oral or online assessment held partway through a course covering one or more learning outcomes.

Assignment

An assignment may include any of the following:

- laboratory exercise and written report
- practical exercise
- essay
- analysis/design with documentation
- written description/evaluation/essay
- investigation and written report
- folders of work
- Case study: a case study consists of a scenario, usually supported by documentation, which may be real or fictitious, from which learners are expected to work under the direction of the academic staff member.

Presentation

Presentations can vary from informal classroom presentations to the much more formal delivery expected in project presentations. They may be required for several reasons, for example, to explain the results of a study and to assess presentation skills.

Project

A project is usually defined in discussion with the academic staff member, and learners then work under the supervision of the academic staff member.

Journal

A journal is a regularly updated personal commentary that records the learner's development during the course. It may be of a self-reflective, exploratory nature, or a log of progress and processes used in a project. Each learner will be issued with a guide to help develop the reflective journal process.

Group assessment

In group assessments, learners will be informed by the academic staff member, before the commencement of the assessment, how any individual's work will contribute to the final grade for the assessment.

Examination

An examination is a significant controlled written, oral or online assessment at or near the end of a course forming a major part of the overall assessment.

Learning Hours

Teaching weeks:	34
Vacation weeks:	2
Total gross weeks:	36

	Level 5	Level 6	Level 7	Average over degree
Teaching hours per week:	15.3	12.2	8.4	12
Self-directed learning hours / week:	20	23	27.1	23.3
Total learning hours/week:	35.3	35.3	35.3	35.3

Assessment requirements and grading method

The grading method is GM2. Where grades are allocated according to the level of achievement the following grading system applies to both assessment results and course grades.

Achievement	Description	Grade	Grade Point [1]	Result / Mark Range [2]
Excellent	Learning outcomes met. Proficient in the most difficult concepts, theories and skills. Is able to integrate concepts, theories and skills, and recognise the links and relationships between them. Is able to adapt and apply concepts, theories and skills to new situations, and to formulate and evaluate new ideas.	A+	4	90–100
		A	4	80–89
Good	Learning outcomes met. Is able to use and apply the fundamental theories, concepts and skills of the learning outcomes to a wide range of problems, going beyond mere replication of content knowledge or skill. Shows an understanding of key ideas, awareness of their relevance, some use of analytical skills and some originality.	B+	3.3	75–79
		B	3	65–74
Satisfactory	Learning outcomes met. Has a basic grasp of factual content, theories, concepts and issues, and/or performance of basic skills to a level that would allow continuation of study in the area or to carry out work requiring these skills.	C+	2.3	60–64
		C	2	50–59
Ungraded Pass	Learning outcome/s met. Ungraded assessment result and/or course grade.	P	1	P
Not Achieved	Unsuccessful assessment attempt result; optional assessment not submitted result (0) Course grade when all required assessments attempted but one or more learning outcomes not met.	D	0	0–49
Ungraded Fail	Required assessment not submitted; Course grade when either one or more required assessments are not attempted and/or one or more course requirements are not met.	F	0	F

[1] See website for how to calculate Grade Point Average (GPA)

[2] If assessments are marked with a grade, the mid-point of the grade range is used in the course grade calculation

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

To pass a course where there is an examination set, a learner must:

- Attempt all assessments,
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

Results

You can log into results.weltec.ac.nz to access your provisional results. If you have any questions about these results please talk to your Tutor. While you are logged in, please check and update your address and contact details, so that the final results are mailed to the correct address. Finalising results can take up to six weeks after the official finish date of your programme. If eligible, you may have one reassessment per course. The School will negotiate with you a new date for the reassessment upon receipt of the resit application form. An administration fee will be charged.

Any reassessment will receive a maximum of 50% of the available marks for that assessment.

Late submission of work

In the case of illness, injury or exceptional circumstances an extension no later than the course end date may be granted by the course tutor. You will need to complete an Extension before the course ends form. A new date will be negotiated with the tutor at this time.

Extensions beyond the course end date may be granted as outlined in the Academic Statute. To start the process, you need to complete an Extension after course ends form.

You are encouraged to discuss any concerns about an assessment result with your tutor in the first instance.

Unless otherwise stated in individual programme regulations, the following regulations apply:

1.1 If you find a mistake in the counting or addition of marks, you may request a recount from your tutor within five (5) working days of the assessment results being released.

1.2 If you consider that your assessment has not been marked according to the assessment criteria, you may challenge your result in writing to the Programme Manager within five (5) working days of your assessment results being released.

1.3 If you can provide evidence of a procedural irregularity that has materially affected your result, you may challenge your result in writing to the Programme Manager within five (5) working days of your assessment results being released.

1.4 The manager may arrange for your submitted assessment to be re-evaluated by another assessor, who may be independent of the programme. The outcome of the re-evaluation is your final result.

1.5 You will normally be advised of your final result within ten (10) working days of receipt of your request, or within five (5) working days of receipt of any independent assessor's report, whichever is later.

Opportunity for Further Assessment, re-assessment/re-submission

Extensions, opportunities for further assessment and re-assessment/re-submission are allowed in accordance with A1-R1 Academic Statute and approved by the Programme Manager. There is a limit of one resubmission per course. The highest grade awarded for any resubmission is the lowest possible pass grade. In order to be eligible for reassessment, you must have achieved less than 50% overall in the course, and you must have attempted each of the assessments contained in a course.

Academic Misconduct

Academic misconduct includes any form of dishonest academic practice that intentionally or unintentionally undermines academic integrity and may result in unearned academic benefit.

Plagiarism is using someone else's work without proper acknowledgement including:

a) Copying directly from any source
b) Summarising another's work
c) Using research data obtained by another

Plagiarism also includes:

a) Copying the work of another student
b) Re-use of previously submitted work
c) Submitting an assessment written by someone else
d) Submitting the work of a group when individual work is required
e) Intentionally or knowingly helping or attempting to help another student engage in some form of academic misconduct

Academic misconduct in a supervised assessment includes:

a) Secretly bringing in unauthorised material
b) Copying answers from another student
c) Giving answers to another student
d) Making additions to work outside time allowed

These are likely to be deemed cases of serious academic misconduct.

Other forms of academic misconduct include misrepresentation of identity or circumstances, data falsification and breach of ethics.

A first instance of Academic Misconduct may be regarded as unintentional through a lack of understanding. When an allegation of Plagiarism is being investigated, the student will be informed in writing and be asked to meet with the Head of School.

Attendance

Attending all your timetabled classes greatly improves your chances of successfully completing your qualification. Below is some important attendance information to be mindful of during your studies here:

1. If you are receiving a student allowance you must attend classes and show academic progress; if you don't, your allowance may be stopped. It's worth noting that we can reinstate your allowance if you show significant improvement.
2. We are tasked by the government to make you 'work ready'. To achieve this goal we expect you to:
   - Attend all your classes
   - Notify us if you are going to be absent
   - Provide a medical certificate if you are sick for longer than three days.
3. If you are sick at the time of an assessment/test or when an assignment is due you must provide a medical certificate to be eligible for a resit/resubmission or extension.
4. If you are an International student Immigration NZ insists on 100% attendance, unless sick and able to provide a medical certificate as proof.

Student ID and Access Cards

Once your enrolment has been confirmed, you can obtain a Student ID Card from the Student Information Centre anytime between Orientation Day and your first couple of weeks of study. Student ID Cards are your formal identification for around campus. It also gives you access to printing, using the library and receiving student discounts. You may also need after-hours access to certain rooms in order to carry out your study. If this is the case, you should be issued with the access card when you get your Student ID Card.

Change of Enrolment

If in the first two weeks of your programme you realise your courses aren't correct or you are advised by your tutor that you should be doing a different course and you want to transfer your enrolment, or you discover that the qualification you are enrolled in is just not floating your boat and you want to withdraw, then you need to fill in the Change of Enrolment/Withdrawal Form. This must be dropped off to the Student Enrolments Team located in the student hub or visit the Student Enrolments Team in person to arrange your transfer. Completing the withdrawal process within the two-week time frame will ensure you are not left with a debt for no reward. The Student Enrolment Team can chat to you about this and other options going forward.

All forms can be found on the **whitireiaweltec.ac.nz**

Health and Safety

WelTec and Whitireia work hard to ensure that you are safe while on our campuses. Your job, as a student, is to follow instructions when asked by staff who are looking after your safety. Please also ensure that any medical issues have been declared on your enrolment form.

If part of your course requires you to attend practical classes, you must wear the prescribed protective clothing and footwear during these classes.

Random Drug Testing does occur. If you are involved in an accident you may be drug tested. If you are going on work placement you will be drug tested. If you refuse you will be stood down.

For more information about Health and Safety around campus visit www.whitireiaweltec.ac.nz

Learner support and ICT Services

Student Support Services

We do everything we can to make sure our students get all the support they need to succeed at Whitireia and WelTec. Find out about all of our support services that will help you on your learning journey.

Contact us for more information:
Learner Support Services
Phone: 0800 141 121
Email: LSS@wandw.ac.nz

ICT Services

WelTec provides you with computers, printers/photocopiers, and software on our campuses to support your study. You can bring your own device (smartphone, laptop or tablet) and connect to our wireless network on most campuses. You can log in at any time after you have received your Enrolment Confirmation letter, which has your login ID and password in it. You can log into any campus in the Learning Commons. Your first login will need to be at one of our campuses.

For more information about ICT Services and your student login visit the www.whitireiaweltec.ac.nz.

Appendices – Course Descriptors

Appendix A: NZ Certificate in Information Technology Essentials (Level 4)

IT4104	Fundamentals of Information Technology Infrastructure

Level 4 **Credits 15**

Learning hours 150 total hours (85 tutor-directed, 65 self-directed)

Aim

The learner will apply essential knowledge and concepts of computer hardware, operating systems, applications, networks, storage and security conforming to professional practice and ethical principles.

Learning outcomes

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

1. Describe the main components of a computer, range of Operating Systems, and basic networking concepts, devices and services.
2. Demonstrate the basic troubleshooting techniques, including assembly, disassembly, and maintenance, adhering to good practices and safety.
3. Install and configure software applications, including Operating Systems, device drivers, network, storage and security conforming to good industry practices.
4. Describe professional and ethical principles and practices to comply with legal and IT Infrastructure requirements.

Content

- Computer components should include but are not limited to: motherboard, Central Processing Unit (CPU), memory, Power Supply Unit (PSU), storage devices, input/output devices.
- Computer system setup including troubleshooting common problems, online help and other resource information and using research to find relevant information.
- Operating system and applications: should include but not limited to: installation, basic configuration, standard command line utilities, installing device drivers.
- Network should include but not limited to LAN with Internet access.
- Storage should include local and cloud storage.
- Security should include but not limited to end-user security settings, browser settings, anti-malware, firewall and file/folder sharing.
- Professional and ethical principles and practices include but are not limited to health and safety, software licensing, language packs, spamming, privacy, ITP's Code of Ethics and Code of Practice, ngā kaupapa o te Tiriti o Waitangi (the principles of the Treaty of Waitangi), and Australia/New Zealand standards (AS/NZS) such as AS/NZS 3000 and AS/NZS 3080.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Labs	40%	1-4
Assignments	30%	1,4
Tests	30%	1-4

Successful completion of course

Students must attempt all assessments and achieve an overall grade of 50% to be successful in this course.

Resources

A list of recommended resources is provided in the course outline.

IT4105	Fundamentals of User Experience and Interface Design

Level 4 **Credits 15**

Learning hours 150 total hours (85 tutor-directed, 65 self-directed)

Aim

The learner will apply essential knowledge and concepts of business analysis, user experience and interface design to ethically create interactive digital media while demonstrating project management and communication skills.

Learning outcomes

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

1. Describe user experience in interactive digital media design based on client requirements with ethical consideration.
2. Apply business analysis in planning, designing, and developing interactive digital media solutions for a client, emphasising User Experience (UX) and User Interface (UI) using appropriate tools and techniques.
3. Apply Systems Development Life Cycle (SDLC) process in developing client solutions.
4. Demonstrate communication skills when working with a client and reflecting on a finished project.

Content

- Business Analysis, User Experience (UX) and User Interface design (UI)
- Digital media design concepts: including tools and techniques; multimedia (graphics, sound, video, text)
- Lifecycle methodology: Initiation, planning, execution, and closure
- Ethics considerations: Creative Commons, Copyright; Privacy; harmful digital communications act
- Communication: interpersonal skills, collaboration, self-management

Assessments

Assessment Method	Weighting	Learning Outcome/s
Labs	35%	1, 2
Project	65%	1 - 4

Successful completion of course

Students must attempt all assessments and achieve an overall grade of 50% to be successful in this course.

Resources: A list of recommended resources is provided in the course outline.

IT4106	Fundamentals of Information Systems

Level 4 **Credits 15**

Learning hours 150 total hours (85 tutor-directed, 65 self-directed)

Aim

The learner will apply essential knowledge and concepts of information systems and project management methodologies in developing a relational database solution for an organisation.

Learning outcomes

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

1. Describe information system solutions to address the needs and opportunities of an IT organisation.
2. Describe and apply project management methodologies or practices and planning tools to meet the requirements of the client's brief.
3. Plan, design, develop and test a simple relational database that includes tables, queries, forms, reports and controlling data entries.
4. Describe and apply knowledge of ethics and legality to comply with the requirements of an IT organization.
5. Demonstrate interpersonal and communication skills through project work.

Content

- Core components of an organization's information system
- Relational database including tables, queries, forms, and reports
- Operators and common functions used in controlling and managing database records
- Relevant project management methodologies including Agile and Waterfall
- Project management planning and monitoring tools
- Ethics and legality: Māori data sovereignty; principles of the Treaty of Waitangi; diversity and inclusion; and self-management to comply with internal policies
- Communication: which may include collaboration with a client, end-user documentation, reflective journal, test report, etc.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Labs	30%	3
Assignments	10%	1, 2, 4
Project	60%	1-5

Successful completion of course

Students must attempt all assessments and achieve an overall grade of 50% to be successful in this course.

Resources: A list of recommended resources is provided in the course outline.

IT4107	Fundamentals of Software Development

Level 4 **Credits 15**

Learning hours 150 total hours (85 tutor-directed, 65 self-directed)

Aim

The learner will apply essential knowledge and concepts of software development to create simple applications.

Learning outcomes

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

1. Describe mathematical and logical concepts that underpin the theory and practice of software development.
2. Apply fundamental programming, mathematical and logical concepts and use relevant software development tools, including logic diagrams and pseudocode, in developing a simple application.
3. Apply software development life cycle and other relevant development practices in creating a simple application.

Content

- Programming fundamentals
- Mathematical and logical concepts
- Software development lifecycle and practices which may include DevOps
- Software development tools and techniques

Assessments

Assessment Method	Weighting	Learning Outcome/s
Test	10%	1
Labs	30%	2
Project	60%	2,3

Successful completion of course

Students must attempt all assessments and achieve an overall grade of 50% to be successful in this course.

Resources

A list of recommended resources is provided in the course outline.

IT5115	IT System Overview

Level 5 **Credits 15**

Pre-requisites None

Learning hours Tutor-directed 85
Self-directed 65

Aim

This course introduces the skills and knowledge students will require to enable them to provide effective IT solutions for an organisation.

Learning Outcomes

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

1. Explain business concepts and organisational requirements
2. Apply professional and ethical principles and practices as an emerging IT professional.
3. Apply user experience and usability concepts in IT
4. Apply basic principles of interactive design to create interactive digital media

Content

- Business concepts
- Professional and ethical principles and practice of an emerging IT professional
- Development approaches and methodologies including Agile, Dev ops and design thinking
- User experience – consideration of user experience and usability concepts in IT; information management and retrieval
- Interaction design and human computer interaction, including accessibility
- Web design and interactivity
- Emerging technologies from an interaction perspective.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Written Assessment	20%	1, 2
Practical Assessment	50%	3, 4
Practical Test	30%	2

Successful completion of course

A student must gain 50% or more of the total available marks from the course work and have made a genuine attempt of all assessments.

Resources

A list of recommended resources is provided in the course outline.

IT5116	Database Administration

Level 5 **Credits 15**

Learning hours	Tutor-directed	85
	Self-directed	65

Aim

This course introduces students to key database concepts as well as developing skills to manage and administrate a relational database.

Learning outcomes

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

1. Describe and apply database administration and query languages (SQL) to meet organisational data storage and retrieval requirements, including database management (DBMS) optimisation, cleansing, security, and backups.
2. Implement the fundamental knowledge of data modelling.
3. Apply fundamental mathematical and logical concepts for a relational database.
4. Apply problem-solving techniques to database related issues.

Content

- Relational database concepts
- Database Management System (DBMS)
- Basic SQL commands
- Relational Database Administration
- Relational Algebra

Assessments

Assessment Method	Weighting	Learning Outcome/s
Practical Assessment	60 %	1, 2, 4
Practical Test	10 %	1
Written Test	30 %	1 - 4

Successful completion of course

Students must gain 50 % or more of the total available marks from the course work and have made a genuine attempt of all assessments.

Resources

A list of recommended resources is provided in the course outline.

IT5117	Hardware Servicing

Level 5 **Credits 15**

Pre-requisites None

Learning hours Tutor-directed 85
Self-directed 65

Aim

This course introduces students to the troubleshooting and maintenance of computer hardware, software, and peripherals. The students will understand the fundamentals and basic concepts of computer security and networks.

Learning Outcomes

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

1. Identify, select, install, configure, and troubleshoot hardware devices and software applications.
2. Evaluate the different components of IT hardware devices, including PC, laptop, motherboard, power supply, and storage.
3. Apply troubleshooting knowledge and techniques in configuring peripheral connections in a secure manner to meet security and organisational requirements.

Content

- Computer parts and tools
- Working inside Desktop computers and Laptops
- Storage hardware, and storage technologies.
- Processors and memory
- Power systems and troubleshooting

Printers and I/O devices

Assessments

Assessment Method	Weighting	Learning Outcome/s
Practical Assessment	80%	1 - 3
Written Test	20%	1 - 3

Successful completion of course

A student must gain 50% or more of the total available marks from the course work and have made a genuine attempt of all assessments.

Resources

Comp T

IA A+

IT5118	Professional Practice

Level 5 **Credits 15**

Pre-requisites None

Learning hours Tutor-directed 85
Self-directed 65

Aim

The course enables students to apply professional, legal, and ethical principles and practices in a socially responsible manner, and apply business concepts and analysis, communication, and interpersonal skills relevant to IT roles.

Learning Outcomes

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

1. Apply business concepts and analysis in the IT context to support organisational systems and processes.
2. Understand and apply professional, sustainable, socially responsible and ethical principles; ethical work practice and professional behaviour.
3. Demonstrate communication, information design, report, and technical writing skills for the IT environment.
4. Demonstrate personal, self-management and interpersonal skills, including collaboration, teamwork, customer service, relationship management, and conflict resolution.

Content

- Professional, sustainable, socially responsible, and ethical principles; ethical work practice and professional behaviour.
- The Treaty of Waitangi; Accessibility and equity issues facing IT.
- Communication, information design skills, report and technical writing.
- Research literacy, referencing, report writing and documentation.
- Business concepts and business analysis
- Technical documentation.
- Personal and interpersonal skills, including teamwork and interviewing skills
- Social and cultural awareness.
- Self-management skills. **Assessments**

Assessment	Weighting	Learning Outcome/s
Written Assessments	50%	1, 2
Practical Assessments	30%	3 - 4
Test	20%	1 - 3

Successful completion of course:

A Student must gain 50% or more of the total available marks from the course work and have made a genuine attempt of all assessments.

Resources

A list of recommended resources is provided in the course outline.

IT5119	IT Technical Support

Level 5 **Credits 15**

Pre-requisites IT5115 IT System Overview

Learning hours Tutor-directed 85
Self-directed 65

Aim

The course enables students to apply knowledge of IT Service Management and be able to troubleshoot and resolve a range of common systems, networking, application and security problems using appropriate tools and procedures.

Learning outcomes

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

1. Apply problem-solving techniques within an IT context
2. Manage systems and application and understand how to meet performance, capacity, and business continuity requirements of an organisation
3. Troubleshoot and solve a range of common system problems using appropriate tools and procedures
4. Demonstrate the operational knowledge needed to follow standard procedures and provide high level service to the end user through customer service skills, communication, and documentation.

Content

- Problem solving
- Customer service skills
- Effective communication
- Troubleshooting technical support issues
- IT technical support documentation
- Service tools
- IT service management frameworks
- Business continuity requirements for an organisation.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	20%	1
Assignment 2	30%	2
Practical Assessment	30%	3, 4
Written Test	20%	1, 2

Successful completion of course

Students must gain 50% or more of the total available marks from the course work and have made a genuine attempt of all assessments.

Resources: ITIL reference resources.

IT5120	Server Management

Level 5 **Credits 15**

Pre-requisites IT 5117 Hardware Servicing

Learning hours Tutor-directed 85
Self-directed 65

Aim

This course enables students to demonstrate skills in planning, building, maintaining, troubleshooting, securing, and supporting server hardware and software.

Learning Outcomes

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

1. Explain the basic principles of server architecture
2. Apply server administration to meet an organisation's requirement
3. Investigate and apply storage solutions within an organisation
4. Apply networking security within server architecture
5. Select, install, and configure application software in a secure manner to meet security, ethical and organisational requirements.

Content

- Server architecture
- Server installation and administration
- Storage hardware and technologies
- Network security methods and concepts
- Networking within server architecture
- Disaster recovery and troubleshooting.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Practical Assessment	80%	1 - 5
Written Test	20%	2 - 5

Successful completion of course

A Student must gain 50% or more of the total available marks from the course work and have made a genuine attempt of all assessments.

Resources

Compt TIA Server +

IT5121	Fundamentals of Programming and Problem-solving

Level 5 **Credits** 15

Learning hours	Tutor-directed	85
	Self-directed	65

Aim

The course enables students to learn and apply the principles of problem solving to create simple working applications by programming and software development**.**

Learning outcomes

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

1. Apply mathematical and logical concepts to solve problems related to IT
2. Demonstrate problem-solving skills in specific IT contexts with awareness of procedural and object-oriented programming.
3. Create applications using programming languages, including demonstrating skills to test and create support documentation.
4. Apply SDLC (Software Development Life Cycle) to plan, analyse, design, test, implement and deploy software.
5. Use various tools and techniques for software development.

Content

- Mathematical, logical, and programming concepts
- Flowcharts, Pseudo code and algorithms –
- Procedural & Object-Oriented Programming (OOP) in software development.
- Programming concepts using a software language that supports both procedural and OOP methods.
- Conditions, Loops, Functions and Modules –
- Classes, objects, and methods in OOP.
- Inheritance, Abstraction, Encapsulation and Polymorphism - –
- Device I/O, Software libraries and SDK
- Software testing, maintenance and documentation.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	20%	1,2,5
Assignment 2 (Mini Project)	40%	2,3,4
Tutorials	10%	1 - 5
Test 1(Theory)	15%	1,2
Test 2 (Practical)	15%	3,4

Successful completion of course

Students must gain 50% or more of the total available marks from the course work and have made a genuine attempt at all assessments.

Resources: A list of recommended resources is provided in the course outline.

IT5122	Implementing Networks

Level 5 **Credits 15**

Pre-requisites None

Learning hours Tutor-directed 85
Self-directed 65

Aim

This course introduces students to the fundamental networking concepts and technologies and the skills needed to implement and maintain a simple network in a secure manner.

Learning outcomes

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

1. Give an overview of network architecture.
2. Select and apply appropriate tools and techniques to configure, monitor and maintain a variety of network devices.
3. Identify network security issues applying a range of solutions to mitigate the issues identified.
4. Demonstrate troubleshooting methodologies for a variety of different network media.
5. Apply industry standards, practices, and network theory in each context.

Content

- Network architecture
- Network operations
- Network security
- Troubleshooting
- Industry standards, practices and network theory

Assessments

Assessment Method	Weighting	Learning Outcome/s
Practical Tests	60%	1 - 5
Theory Tests	40%	1 - 5

Successful completion of course

Students must gain 50% or more of the total available marks from the assessments and a genuine attempt of all assessments is required to be successful in this course.

Resources

A list of recommended resources is provided in the course outline.

Appendix C: NZ Diploma in Information Systems (Level 5)

IT5481	Communication Studies

Level 5 **Credits 15**

Pre-requisites **None**

Learning hours Tutor-directed 85
Self-directed 65

Aim

To introduce students to the theories, principles and practical skills associated with effective communication in relation to Information Technology contexts.

Learning outcomes

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

1. Develop effective ways to influence and improve communications.
2. Develop strategies in relation to teamwork, considering group dynamics, effective meeting techniques, leadership skills, negotiation techniques, and conflict management.
3. Produce a range of business communications, including presenting information in a professional manner, both verbally and non-verbally.
4. Apply skills in relation to business administration and communication practices in relation to note-taking, record keeping, evaluation and planning, including a clear understanding of copyright and citation.
5. Develop skills in relation to workplace ethics, law, cultural awareness, and Te Tiriti o Waitangi.
6. Research and evaluate IT contexts considering past, present well as upcoming and future developments in IT.

Content

- Interpersonal Communication
- Business communication practices including meeting techniques, interviews record keeping, technical writing and use of mainstream business software
- Research & Processing Information, Designing IT Documents, use of citations and referencing techniques
- Knowledge Management Decisions including critical and logical thinking, creating supported arguments, managing negotiation and Conflict management
- Organisational and Intercultural Communication
- Principles and practices of team & Group Work Communication, Leadership, Managing meetings
- Managing relationships, Workplace ethics and legal implications

Assessments

Assessment Method	Weighting	Learning Outcome/s
Practical Tests	20%	1 - 6
Group Assignment 1	30%	1,2,4,6
Group Assignment 2	30%	1-6

IT5482	Fundamentals of Data Models and Databases

Level 5 **Credits 15**

Pre-requisites **None**

Learning hours Tutor-directed 85
Self-directed 65

Aim

To provide learners with a basic understanding of how data is modelled, stored, manipulated and analysed using databases and visualisation techniques.

Learning outcomes

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

1. Describe and explain data using a variety of visualisation techniques and software tools
2. Analyse the data requirements of simple systems and model those requirements using conceptual and logical data modelling techniques
3. Create a simple database and develop a user interface to manipulate the data

Indicative content

Introduction MS Visual Studio, Introduction to user interface development, Data visualisation techniques such as bar charts, pie charts, scatter diagrams, gauges and bubble charts created within a variety of software tools Introduction and Systems Theory m Introduction to design of database systems, System Development Lifecycle (SDLC), Modelling System Requirements, Entity Relationship Concepts, ERD Exercises (1:1, 1:M), ERD Exercises (M:N), Entity Relationship Modelling, Business Rules, Cardinality, Introduction to MS Visio, Introduction to Database Design, Database Design (Continued), Normalization (UNF, 1NF), Data Definition Language (DDL) and MS SQL Server.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Design simple database system	30%	LO 2
Build simple database system 1	30%	LO 3
Final test	40%	LO 1,2,3

Successful completion of course

To pass a course that contains a final exam or controlled final test, students are required to achieve a minimum of 50% overall and achieve a minimum of 40% in the exam.

IT5483	Fundamentals of Software Design and Development

Level 5 **Credits 15**

Pre-requisites **None**

Learning hours Tutor-directed 85

Self-directed 65

Aim

To provide students with an understanding of computer software through the study of logic methods, software development and documentation methods, and give experience in using simple programming language elements.

To understand concepts of systems theory, the stages of the systems development life cycle, and concepts in systems analysis and design.

Learning outcomes

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

1. Make use of the concepts of systems theory and stages of systems development life cycle in relation to business systems and computer systems
2. Apply a variety of logic depiction methods to appropriate simple tasks.
3. Develop skills in relation to user-interface design and human-computer interaction.
4. Develop skills in relation to systems maintenances, support and security tasks throughout the useful life of the system.

Indicative content

Software Development Lifecycle Stages, Business Case Analysis, Project Management, Requirements Modelling, User Experience principles, User Interface Design, Data Process Modelling, Development Strategies, Development tools, Systems Architecture, Systems Implementation, Quality Assurance and testing, System maintenance, support, and security

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	LO 1, 2
Assignment 2	30%	LO 3, 4
Final Exam	40%	LO 1,2,3,4

Successful completion of course

To pass a course that contains a final exam or controlled final test, students are required to achieve a minimum of 50% overall and achieve a minimum of 40% in the exam.

IT5484	Programming

Level 5 **Credits 15**

Pre-requisites **None**

Learning hours Tutor-directed 85
Self-directed 65

Aim

To introduce students to fundamental programming skills.

To provide an opportunity to develop and maintain applications in a commonly used programming language.

Learning outcomes

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

1. Apply critical analysis and decision-making techniques to simple problems.
2. Develop applications with a programming language in human-computer interaction (HCI).
3. Apply quality assurance techniques in a software development environment.
4. Manage resources and produce relevant technical documentation.

Indicative content

Object-oriented Programming, Quality Assurance, CLI and GUI programming, User Experience, Input and Output, Decision Statements, Working with Loop, Array, Working with Structure, Using Methods, Handling Exception, Reading and Writing on Files, Using Classes, Inheritance, Internal and external documentation.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Project 1	30%	LO 1,2,3,4
Project 2	30%	LO 1,2,3,4
Final Exam	40%	LO 1,4

Successful completion of course

To pass a course that contains a final exam or controlled final test, students are required to achieve a minimum of 50% overall and achieve a minimum of 40% in the exam.

IT5485	Mathematics for Information Technology

Level 5 **Credits 15**

Pre-requisites **None**

Learning hours Tutor-directed 85
Self-directed 65

Aim

To introduce learners to topics in discrete mathematics that are important for studies in computing and to topics in statistics that are directed to the needs of the IT industry.

Learning outcomes

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

1. Apply fundamental concepts and applications of discrete mathematics.
2. Apply logic thinking to problem-solving within the context.
3. Demonstrate fundamental statistical skills in writing mathematics.
4. Demonstrate the conceptualization of graphs and trees.
5. Use sampling and probability concepts.

Indicative content

Bases and Numbers, Sets and Relations, Functions, Computer representation of numbers, Logic, Graph theory, Boolean algebra and digital circuits, Measures of central tendency, Visual presentation of data, Measures of central tendency and dispersion including Standard deviation, Sampling and Probability, Correlation and Regression

Assessments

Assessment Method	Weighting	Learning Outcome/s
Test 1	20%	LO1,2,3
Test 2	20%	LO4,5
Assignment/Class exercises	20%	LO1,2,3,4,5
Final Exam	40%	LO1, 2, 3, 4, 5

Successful completion of course

To pass a course that contains a final exam or controlled final test, students are required to achieve a minimum of 50% overall and achieve a minimum of 40% in the exam.

IT5487	Fundamentals of Networking

Level 5 **Credits 15**

Pre-requisites **None**

Learning hours Tutor-directed 85
Self-directed 65

Aim

To introduce students to the fundamental of networking, data communications concepts, principles, technologies, devices, and skills needed to implement a simple network. To enable students to experience installation, configuration, testing and troubleshooting of simple router and switch-based Ethernet networks.

Learning outcomes

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

1. Describe the basic concepts, components, principles, and devices of Ethernet networks
2. Describe the role of network devices and data communications protocol model layers
3. Design and calculate IPv4, IPv6 subnet addressing schemes to meet business needs
4. Apply networking principles to design, document and cable a basic router and switch-based Ethernet network to meet business requirements
5. Apply network operating system commands to configure, verify, test, and troubleshoot routers, switches, and host devices.

Indicative content

Introduction to Ethernet data networks, working with the CLI (Command Line Interface), Identify network types, identify networking components, and protocols, Data encapsulation process, Network devices, Network addressing, Dataflow through network devices, OSI data communication model and layers, TCP/IP network protocol model and layers, Network design goal, Network design documentation, cabling a network, Configuration, verification, testing and troubleshooting commands

Assessments

Assessment Method	Weighting	Learning Outcome/s
Test 1	20%	LO1,2,3
Test 2	30%	LO1,2,3,4,5
Practical 1	20%	LO1,2,3
Practical 2	30%	LO1, 2, 3, 4, 5

Successful completion of course

To pass a course where there is no final examination, a learner must attempt all assessments and achieve an average mark of 50% or above overall assessments.

IT5480	Interaction Design Fundamentals

Level 5 **Credits 15**

Pre-requisites **None**

Learning hours Tutor-directed 85
Self-directed 65

Aim

To provide learners with the skills to utilise design principles to evaluate digital interactive products. Learners will develop the skills and knowledge to design and develop a digital interactive product.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe the history, business, and technical changes of a digital, interactive platform and evaluate social impacts.
2. Investigate interactive tools and apply design principles to evaluate and user-test digital interactive products critically.
3. Plan a digital interactive product demonstrating consideration of users and clients.
4. Apply front-end development processes to create an interactive product.
5. Integrate toolsets or languages to create digital content or interactivity.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Project 1	55%	1-3
Project 2	45%	4,5
Practical 1	20%	LO1,2,3
Practical 2	30%	LO1, 2, 3, 4, 5

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of 50% or above overall assessments

IT5479	Information Security

Level 5 **Credits 15**

Pre-requisites **None**

Learning hours Tutor-directed 85
Self-directed 65

Aim

To provide learners with an understanding of basic information security principles and approaches as well as to recognise the major information security threats and countermeasures.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Explain information security fundamentals
2. Analyse personal security
3. Identify threats to computer security
4. Identify and apply internet security procedures
5. Examine mobile security
6. Identify risks to Internet privacy

Indicative content

Information security fundamentals, Personal security, Computer security, Malware, Mobile Security, Privacy

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1-3
Assignment 2	30%	4-6
Final Exam	40%	1-6

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of 50% or above overall assessments, including the examination
- Achieve a mark of 40% or above in their final examination

IT5501	Mathematics for IT

Level 5 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 65 hours
Self-directed 85 hours

Aim

To introduce learners to topics in discrete mathematics that are important for studies in computing and to topics in statistics that are directed to the needs of the IT industry.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Solve problems in selected topics in discrete mathematics
2. Solve problems in selected topics in statistics

Indicative content

Algorithms, Number bases, Computer representation of numbers, Logic, Sets and relations, Functions Induction and recursion, Boolean algebra and digital circuits, Graph theory, Trees, Visual presentation of data

Measures of central tendency, Measures of dispersion including standard deviation, Sampling, Probability, The normal distribution, Correlation, Regression, Hypothesis testing

Assessments

Assessment Method	Weighting	Learning Outcome/s
Test 1	20%	1 - 2
Test 2	20%	1 - 2
Assignment	20%	1 - 2
Final Assessment	40%	1 - 2

Assignments can be broken down into a number of small modules.

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

IT5502	Communications for IT

Level 5	**Credits 15**	
Pre-requisites	None	
Learning Hours	Tutor Directed	65 hours
	Self-directed	85 hours

Aim

To introduce learners to the theories, principles and practical skills associated with effective communication in relation to Information Technology contexts.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe effective ways to influence and improve communication in a business setting and demonstrate knowledge of the principles of communication methodologies and influences
2. Undertake a range of business communication techniques and practices
3. Apply effective communication strategies through co-operative work in a group, leadership, negotiation techniques and conflict management
4. Demonstrate an understanding of workplace ethics, law, cultural awareness, and Te Tiriti o Waitangi
5. Demonstrate an understanding of copyright and citation issues
6. Verbally present information in a professional manner

Indicative content

- Principles of effective communication strategies
- Business communication practices including: meeting techniques, interviews record keeping, technical writing and use of mainstream business software
- Principles and practices of team and group work, leadership, negotiation, conflict management, workplace ethics and legal implications
- Verbal and non-verbal communication
- Use of citations and referencing techniques
- Effective oral presentations

Assessments

Assessment Method	Weighting	Learning Outcome/s
Test	20%	1, 4
Assignment 1	30%	2, 5
Group Assignment 2	30%	1 - 5
Presentation	20%	4, 6

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

IT5503	Programming I

Level 5 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 65 hours
Self-directed 85 hours

Aim

A learner will be able to design software using appropriate **syntax**, implement software designs and **apply** basic object-oriented concepts.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Translate program designs into a programming language.
2. Design structured programs using the principles of the top-down-refinement of pseudocode.
3. Design structured programs using flow charts to illustrate the nesting of control structures.
4. Design object-oriented programs using an iterative and incremental process.
5. Execute and debug programs.

Indicative content

- Introduction to primitive data types, operators
- Pseudocode and flow chart
- Conditional statements and iteration
- Declaring, defining and using functions for structural as well as object-oriented programming
- Passing parameters to functions by value and by reference
- Arrays
- String class
- User defined types
- Unit testing
- Reusability
- Recursion

Assessments

Assessment Method	Weighting	Learning Outcomes
Assignment 1	30%	1 - 5
Assignment 2	30%	1 - 5
Examination	40%	1 - 5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IT5504	Information Security I

Level 5 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	65 hours
	Self-directed	85 hours

Aim

To provide learners with an understanding of basic information security principles and approaches as well as to recognise the major information security threats and countermeasures.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Explain information security fundamentals
2. Analyse personal security
3. Identify threats to computer security
4. Identify and apply internet security procedures
5. Examine mobile security
6. Identify risks to Internet privacy

Indicative content

- Information security fundamentals
- Personal security
- Computer security
- Malware
- Mobile security
- Privacy

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1 - 3
Assignment 2	30%	4 - 6
Examination	40%	1 - 6

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IT5505	Interaction Design Fundamentals

Level 5 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 65 hours
Self-directed 85 hours

Aim

To provide learners with the skills to utilise design principles to evaluate digital interactive products. Learners will develop the skills and knowledge to design and develop a digital interactive product.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe the history, business and technical changes of a digital, interactive platform and be able to evaluate social impacts.
2. Investigate interactive tools and apply design principles to critically evaluate and user-test digital interactive products.
3. Plan a digital interactive product demonstrating consideration of users and clients.
4. Understand and apply front-end development processes to create an interactive product.
5. Integrate toolsets and/or languages to create digital content and/or interactivity.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Project 1	55%	1 - 3
Project 2	45%	4, 5

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

IT5507	Fundamentals of Data Science

Level 5 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 65 hours
Self-directed 85 hours

Aim

To provide learners with a basic understanding of how data is modelled, stored, manipulated and analysed using databases and visualisation techniques.

Learning Outcomes

On successful completion of this course, the learner will be able to

1. Describe and explain data using a variety of visualisation techniques and software tools
2. Analyse the data requirements of simple systems and model those requirements using conceptual and logical data modelling techniques
3. Create a simple database that includes tables, columns, primary keys, foreign keys and simple queries

Indicative content

- Data visualisation techniques such as bar charts, pie charts, scatter diagrams, gauges and bubble charts created within a variety of software tools
- Conceptual and logical data modelling techniques that capture the data requirements of simple systems
- Normalisation of tables
- Introduction to Structured query Language (SQL) such as Data Definition language (DDL) and Data manipulation language (DML) statements to create simple databases and to manipulate and extract data

Assessments

Assessment Method	Weighting	Learning Outcome/s
Coursework	60%	1, 2, 3
Test	40%	1, 2

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

IT5509	Software Testing Fundamentals

Level 5 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 65 hours
Self-directed 85 hours

Aim

This course introduces the theory and practice of software testing. This is a vocational course to help learners seek employment in junior software testing roles and/or gain foundation-level software testing certification.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe the fundamentals of testing, testing throughout the software life cycle, and static techniques.
2. Identify test design techniques, and apply specification-based or black-box techniques and structure-based or white-box techniques in a practical situation.
3. Describe the management of testing and apply incident management in a practical situation.
4. Explain static techniques.

Indicative Content

- Fundamentals:
  - The importance of testing and general testing principles.
  - The fundamental test process.
  - Procedures and processes in software testing. Range psychology of testing, Software development models, Test levels, Test types, Maintenance testing, Static techniques and the test process, Review process, and Static analysis by tools.
- Test Design Techniques:
  - Test Development Process, and categories of test design techniques.
  - Equivalence partitioning, boundary value analysis, decision table testing and state transition testing.
  - Designing test cases for given control flows.
  - Experience-based techniques and choosing test techniques.
- Test management:
  - Test organization, Test planning and estimation, Test progress monitoring and control, Configuration management, and Risk and testing
  - Incident reporting
- Tool support for testing:
  - Types of test tools, effective use of tools, and potential benefits and risks
  - Fundamentals of introducing a tool into an organization

Assessments

Assessment Method	Weighting	Learning Outcome/s
Theory assessment	30%	1 - 4
Practical assessment	30%	2, 3
Examination	40%	1 - 4

Successful completion of the course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of 50% or above over all assessments, including the examination
- Achieve a mark of 40% or above in their final examination

IT5510	Introduction to Operating Systems

Level 5 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 65 hours
Self-directed 85 hours

Aim

- To introduce the underlying principles, evolution and the implementation of operating systems.
- To provide an opportunity to gain experience in using operating system instructions.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Identify the components of operating systems.
2. Describe the evolutionary path of operating systems.
3. Describe the background and underlying principles of operating systems.
4. Describe the operational methods of operating systems.
5. Apply operating system commands.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment	25%	1, 2, 3
Lab Activities	35%	4, 5
Final Exam	40%	1 - 5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

Resources

Indicative text:
OpenCV # Computer Vision Application Programming Cookbook, latest edition. Author Robert Laganiere.

Teaching and Learning resources can include:

- Lectures
- Tutorial assistant
- Classrooms equipped with computer and data projector
- Online course resources such as lab work sheets, walkthroughs, readings, video demos, and quizzes are available to learners.
- Specialist guest speakers
- Specialist IT lab
- Library including online resources

The course outline will contain a list of recommended resources.

CS6501	Information Security I

Level 6 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To enable learners to develop an understanding of the foundations of cyber security, threats towards information system, and perform risk assessment and management.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe information security principles, key terms and essential concepts and examine the business drivers behind the design process of information security analysis
2. Identify and explain common attack techniques and sources of threat
3. Conduct a fundamental information security assessment for an organisation, including risk identification and assessment, implementing effective control measures to minimise the risk introduced by potential threats, and performing cost benefit analysis
4. Describe and apply physical, procedural and technical controls to protect information system components
5. Describe and explain legal, regulatory, and ethical standards relevant to an information systems

Indicative content

- Confidentiality, integrity and availability
- Identification, authentication, authorisation and access control
- Auditing and accountability
- Attacks, threats and vulnerabilities
- Operating system and application security
- Physical, personnel and operations security
- Network security controls
- Security standards and policies
- Risk assessment and management
- Legal, ethical and professional issues in information security

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1-3
Assignment 2	30%	3-5
Examination	40%	1-5

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS6502	Linux System Administration

Code	Title
Level 6	**Credits 15**
Pre-requisites	IT5504 Information Security 1 IT5506 Introduction to Networking
Learning Hours	Tutor Directed 52 hours Self-directed 98 hours

Aim

To provide a practical introduction to junior and intermediate level Linux/Unix system administration and to enable the learner to develop the skills required to manage small-sized Linux networks.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Explain the fundamental elements of the Linux/Unix systems
2. Install, configure and manage a workstation including partitioning, managing software and devices, Linux desktop and shell environments through the command line
3. Explain and perform administrative and troubleshooting tasks including, but not limited to, management of users, groups, printing services, managing Linux processes, file and folder permissions, log management, backup and basic security tasks through command line
4. Demonstrate an understanding of Linux networking services, setup basic Local Area Network (LAN) and Internet connectivity and perform network troubleshooting
5. Install, configure and manage a range of systems present in a typical Linux network environment

Indicative content

- Kernel, boot, initialisation, shutdown and run levels
- Printing, documentation and shell environments
- Linux installation, GNU and Unix commands, managing hardware and devices
- The X Window System, Linux file systems, Linux user and group management, file and folder permissions, Linux processes and task scheduling
- Package management, compiling software from source, shell scripting and basic shell programming
- Administrative tasks including management of networking services, backup and security
- Basic network configuration, setup and configuration of network services such as web server, file server, Dynamic Host Configuration Protocol (DHCP) and email servers

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1-3
Assignment 2	30%	2-5
Examination	40%	1-5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS6503	Digital Forensics

Level 6 **Credits 15**

Pre-requisites IT5504 Information Security I

IT5506 Introduction to Networking

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To provide learners with a comprehensive understanding of digital forensic principles and the collection, preservation, and analysis of digital evidence.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Identify the attributes of file systems and storage media and perform analysis on at least two common file systems
2. Identify and analyse potential sources of electronic evidence
3. Describe the importance of maintaining the integrity of digital evidence
4. Perform basic forensic data acquisition and analysis using computer and network-based applications and utilities
5. Accurately document forensic procedures and results and develop a case summary

Indicative content

- Forensic investigation
- Operating system functionality
- File system analysis
- Operating system artifact analysis
- Browser and email analysis
- Investigative methodologies
- Forensic report writing
- Overview of memory forensics

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1, 2, 4
Assignment 2	30%	2, 3, 5
Examination	40%	1-5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS6504	Cryptography and Blockchain Fundamentals

Level 6 **Credits 15**

Pre-requisites IT5504 Information Security I

IT5506 Introduction to Networking

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

This course exposes learners to blockchain technology, smart contracts, fundamentals of cryptocurrency and applications. Learners will also learn the fundamentals of cryptography.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Explain blockchains and the cryptocurrency ecosystem
2. Analyse the role cryptography plays in a blockchain
3. Develop simple blockchains and distributed applications
4. Examine security issues within the cryptocurrency ecosystem

Indicative content

- Basic Cryptography: public/private key encryption, hash functions, digital signatures, Merkle trees
- Blockchain:
  - Properties: immutability, consensus, anonymity
  - Components: node, distributed ledger, transaction
  - Operations: verification, proof of work
- Smart contracts and blockchain applications
- Privacy and scalability issues in blockchain
- Block ciphers
- Digital signatures

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1: written	20%	1-2
Assignment 2: Labs	20%	1-2
Group Project	20%	3
Examination	40%	1-4

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

DS6501	Social Data Analytics

Level 6 **Credits 15**

Pre-requisites IT5507 Fundamentals of Data Science

Learning Hours

Tutor Directed	52 hours
Self-directed	98 hours

Aim

To introduce learners to the analysis of social data using tools and techniques to extract knowledge and insights from social media networks.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Identify and explain contemporary text mining tasks typically applied to document collections
2. Perform introductory text mining tasks on publicly available social media data
3. Identify and explain the visual analytical concepts applied to large social data sets
4. Analyse and discuss current social, ethical, security and privacy issues relating to large-scale social data analytics

Indicative content

- Social data analytics and the factors of context, content and sentiment
- Machine learning techniques employed to model and structure the information content of textual data
- Text analytics techniques used in sentiment analysis to determine people's attitudes
- Data mining techniques such as link and association analysis, visualisation and predictive analytics using statistical programming tools
- API's for accessing data on social networks
- Contemporary issues relating to social media data

Assessments

Assessment Method	Weighting	Learning Outcome/s
Course work	60%	1, 2
Test	40%	1, 3, 4

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

DS6502	Data Analysis and Visualisation

Level 6 **Credits 15**

Pre-requisites IT5507 Fundamentals of Data Science

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To introduce learners to a range of data analysis and visualisation techniques used in statistical inference and exploratory data analysis.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Use statistical programming tools and visualisation techniques to analyse data
2. Identify and explain a variety of techniques used in statistical inference and exploratory data analysis
3. Interpret and evaluate results derived from the application of confirmatory data analysis techniques
4. Communicate the meaning of results derived from data analysis to a target audience

Indicative content

- Intermediate statistics for data analysis; confidence intervals, regression analysis, hypothesis tests, accuracy, precision, specificity/selectivity and correlation analysis
- Information visualisation techniques used in exploratory data analysis
- Statistical programming languages used to generate descriptive models of data
- Methods of communicating results derived from data analysis to a target audience

Assessments

Assessment Method	Weighting	Learning Outcome/s
Course work	60%	1, 3, 4
Test	40%	2, 3, 4

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

DS6503	Data Mining Tools and Techniques

Level 6 **Credits 15**

Pre-requisites IT5507 Fundamentals of Data Science

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To introduce learners to the data science process and the application of data mining tools and techniques.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Identify and explain the steps associated with the data science process
2. Define the data requirements for a range of analytical problems
3. Identify and explain the basic application of a variety of commonly used data mining techniques
4. Perform an introductory analytical investigation using the data science process and a statistical programming tool

Indicative content

- The steps of the data science process and its application within business analytics
- Data pre-processing techniques for dealing messy data using software tools
- Determining data requirements to develop predictive models
- Types of data, descriptions of data, measures of similarity and dis-similarity
- Introductory Classification, Association Rules, Clustering and Machine Learning categories of data mining techniques using statistical programming tools

Assessments

Assessment Method	Weighting	Learning Outcome/s
Course work	60%	2, 3, 4
Test	40%	1, 3, 4

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

DS6504	Business Intelligence and Big Data

Level 6 **Credits 15**

Pre-requisites IT5507 Fundamentals of Data Science

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To introduce learners to the techniques used in the design and implementation of business intelligence solutions and the issues relating to big data.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Create Structured Query Language (SQL) queries for extracting and summarising data using joins, subqueries and aggregate functions
2. Identify and explain the issues relating to the management of data and the role of the Database Administrator (DBA)
3. Construct stored procedures to be used in the implementation of reporting applications and to perform basic data pre-processing steps
4. Create a multidimensional model using the star schema architecture in the design of a data warehouse
5. Discuss and explain contemporary issues and challenges relating to big data and business intelligence

Indicative content

- Intermediate Data Manipulation Language (DML) statements involving inner joins, outer joins, aggregate functions, date and string functions to create views and other reporting functionality
- Stored procedures with input and output parameters for data summarisation, error handling, and row processing involved in generating reports and dashboards and the handling messy data
- Issues relating to the management of data and the role of the DBA
- Data warehousing design strategies, star and snowflake schemas
- Issues and challenges relating to big data, cloud computing and the storage of unstructured data
- The Four V's of Big Data.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Coursework	60%	1, 3, 4
Test	40%	2, 4, 5

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

ID6501	Responsive Web Design

Level 6 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

Learners will be able to design and build websites that respond to any device for example, phone, tablet desktop or headset.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the design and architecture of a web or mobile application.
2. Plan a website and organise information effectively.
3. Describe and apply design principles and process to create a website utilising web standards from bodies such as W3C.
4. Use a variety of strategies and technologies to create websites.
5. Create and evaluate responsive web interface designs that adjust to a range of screen sizes and or devices.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Project 1	30%	1,2
Project 2	30%	2, 3
Project 3	40%	3-5

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

IT6501	Systems Analysis and Design

Level 6 **Credits 15**

Pre-requisites IT5507 Fundamentals of Data Science
IT5503 Programming I

Learning Hours	Tutor directed	52 hours
	Self-directed	98 hours

Aim

To enable learners to evaluate and apply the important procedures involved in systems analysis and systems design.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate a range of models, as well as contemporary techniques and procedures, used in the Systems Development Life Cycle (SDLC)
2. Assess various approaches for systems analysis and design for an object-oriented SDLC
3. Produce appropriate analysis and design documentation for a given business problem
4. Analyse and design different components of a system to support contemporary systems architecture
5. Describe the current trends in systems development

Indicative content

The course may contain topics of

- the systems development life cycle models
- role of systems analyst, and systems designer
- adaptive approaches to SDLC compared to a predictive approach
- requirements analysis and its modelling
- systems design and its modelling
- model, view and controller layers of a system
- appropriate development methodologies
- current trends in systems development or equivalent

This content will be delivered in an applied manner, with extensive use of case studies.

Assessments

Assessment Method	Weighting	Learning Outcomes
Assignment 1	30%	1 - 5
Assignment 2	30%	1 - 5
Examination	40%	1 - 5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IT6502	Communications for IT

Level 6 **Credits 15**

Pre-requisites	IT5502	Communications for IT
Learning Hours	Tutor Directed Self-directed	52 hours 98 hours

Aims

- To enable learners to explain the requirements of project planning and control, and use best practice project management techniques and software to manage tasks
- To enable learners to incorporate typical IT industry practices into project management activities

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Define, select, and explain current theories and practices from the current Project Management Body of Knowledge (PMBOK) knowledge areas
2. Apply knowledge from the PMBOK knowledge areas and demonstrate this using appropriate practices and software
3. Explain and explore techniques to deal with significant human resources issues relevant to IT project management

Indicative content

The course may contain topics of:

- The knowledge areas identified in the Project Management Institute's PMBOK contextualised for application in the Information Technology industry
- Practical application of project planning and control tools
- Significant issues relating to managing people in projects
- Agile software development (Jira, VSTS)
- Code versioning
- Project risk

This content will be delivered in an applied manner, including the use of case studies and shared experiences.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Test	20%	1
Project	40%	2, 3
Examination	40%	1-3

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

NI6501	Networking II - LAN

Level 6 **Credits 15**

Pre-requisites IT5506 Introduction to Networking

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

This course introduces the essential knowledge and skills of a networking professional and develops knowledge of the logic and algorithms involved in routing and switching traffic. Learners will develop an understanding of individual routing protocols and concepts and learn to configure network addressing services and to analyse, verify and troubleshoot routing and switching operations.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Configure routers and switches using a variety of common network technologies.
2. Troubleshoot routers and switches using a variety of common network technologies.
3. Configure static and dynamic routes
4. Design and implement classless IPv4 and IPv6 addressing schemes for networks
5. Configure basic router and switch operations and troubleshoot common issues and problems
6. Configure and verify basic addressing services in a small routed and switched network

Indicative content

- Static and Dynamic Routing
- Switch Configuration
- Router Configuration
- Network Address Translation
- ACL , RIP, DHCP & VLANs
- Access Control Lists
- Dynamic Host Configuration Protocol

Assessment

Assessment Method	Weighting	Learning Outcomes
Test 1	20%	1, 2, 3
Test 2	30%	4,5,6
Practical 1	20%	1, 2, 3
Practical 2	30%	4,5,6

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

NI6504	Cloud Computing

Level 6 **Credits 15**

Pre-requisites IT5506 Introduction to Networking

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To develop an understanding of the incorporation and management of cloud technologies as part of broader systems operations. Learning about new technologies that support the changing cloud market as more organisations depend on cloud-based technologies to run mission critical systems, where hybrid and multi-cloud have become the norm.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1 Demonstrate a comprehensive knowledge of the technologies and techniques necessary to configure and maintain a cloud environment

2 Identify and apply appropriate actions to implement and troubleshoot common problems within a cloud environment

Indicative content

- Cloud deployments and configurations
- Security in the cloud
- Maintenance including backup and patching
- Disaster recovery and business continuity
- Cloud management of resources and account provisioning
- Performance baseline comparison and service level agreements
- Troubleshooting common cloud issues
- Troubleshooting networking and security issues
- Storage technologies and cloud storage concepts

Assessments

Assessment Method	Weighting	Learning Outcome/s
Test 1	25%	1, 2
Test 1	25%	1, 2
Practical 1	25%	1, 2
Practical 2	25%	1, 2

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

SD6501	Mobile Application Development

Level 6 **Credits 15**

Pre-requisites IT5503 Programming I

IT5507 Fundamentals of Data Science

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To equip learners with the knowledge and fundamental skills of mobile application development using a contemporary programming language and mobile platform.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Develop mobile applications on a popular mobile platform
2. Write mobile application programs that exhibit different features of a programming language
3. Design and develop sophisticated mobile interfaces that utilize rapid prototyping techniques
4. Construct mobile applications that integrate data storage, serialization techniques, and cloud services
5. Combine relevant code debugging and testing methodologies for developing mobile applications
6. Prepare a mobile application for distribution

Indicative content

- Core and advanced concepts of a programming language
- Techniques to plan, design and prototype mobile application
- Development tools
- Mobile device architecture
- User experience and interface design
- Data Storage and Serialization Techniques
- Cloud Services
- Geo-location and Maps
- Multithreading
- App distribution

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1, 3
Assignment 2	30%	1, 5
Final Project	40%	1- 6

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

SD6502	Programming II

Level 6 **Credits 15**

Pre-requisite IT5503 Programming I

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To allow learners to extend their programming skills with the introduction of advanced concepts.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Implement software designs in an object-oriented programming language
2. Analyse relationship between algorithms and programming, and determine their efficiency
3. Implement most commonly used abstract data types and data structures used in software development
4. Apply prototyping techniques
5. Apply effective problem-solving strategies to foster programming skills

Indicative content

- Syntax and semantics of a selected programming language
- Object-oriented programming
- Advanced algorithms, data structures, problem solving strategies
- Static and Dynamic libraries
- Templates

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	25%	1, 2
Assignment 2: labs	10%	2, 3, 5
Group Project	25%	4
Examination	40%	1, 2, 3, 5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

SD6503	Testing and Secure Coding

Level 6 **Credits 15**

Pre-requisites SD6502 Programming II

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To provide learners with an advanced level of knowledge and skills required for developing secure software that is designed and tested using appropriate testing and security tools.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Plan and implement the appropriate level of testing within the context of a software development application following the Systems Development Life Cycle (SDLC) and Software Testing Life Cycle (STLC) models
2. Construct a system that executes advanced testing processes and core testing concepts
3. Develop an automated testing environment that tests complex software application and integrates analysis and interpretation of test data
4. Explain the principles and mechanisms of software security
5. Evaluate common security risk and vulnerabilities
6. Evaluate and use appropriate tools to mitigate security risks in the new code or repair security flaws in the existing code

Indicative content

- SDLC and STLC
- Test Documentation and Test Case Design
- Unit Testing
- Automated Testing and Testing Tools
- Software security and risk principles
- Threat modelling ,Secure coding practices
- Types of software vulnerabilities, Exploits

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1, 2, 3
Assignment 2	30%	4, 5, 6
Final Project	40%	1-6

SD6504	Game Development

Level 6 **Credits 15**

Pre-requisites IT5503 Programming I

IT5501 Mathematics for IT

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

Provide learners with a foundation of effective game design and development using tools, algorithms, and game programming techniques.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Explain basic game architecture and different phases in game development
2. Describe 2D and 3D graphics, game animation and fundamental concepts of game programming
3. Use an industry standard game development engine to build interactive computer games
4. Evaluate and apply game physics, multi-valued logic, and Artificial Intelligence (AI) solutions for game development
5. Optimize, test and deploy developed games into variety of platforms (Desktop, Mobile, Web)

Indicative content:

- Introduction: Design vs Development, architecture, phases of development
- Level Design, 2D & 3D graphics, animation
- Game physics, Collision and Trigger detection
- Artificial Intelligence solutions: Path finding, Finite state machines, Fuzzy logic
- User interface and GUI
- Optimization, Testing, Publishing

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1, 3
Assignment 2	30%	3, 5
Project	40%	1-5

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments
- Specialist guest speakers
- Specialist IT lab
- Library including online resources

Successful completion of course

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination

CS7501	Information Security III

Level 7 **Credits 15**

Pre-requisites IT5504 Information Security I

IT5506 Introduction to Networking

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

This course covers the key technologies and systems required to implement defence in depth and protect organisational information infrastructures from threats and attacks.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe and implement systems and methods employed to provide operating system and host-based security for a range of potential threats
2. Categorise the technologies and techniques necessary for the defence and maintenance of networks and their hosts and demonstrate their use
3. Explain the functionality and operation of security techniques and implement them as they apply to software, databases and data
4. Evaluate the security models, deployment and management of the security of information systems and methods available to identify and reduce risk

Indicative content

- Host-based and operating system security
- Application and data security
- Database security
- Network security
- Security architecture and models
- Risk mitigation techniques

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1-2
Assignment 2	30%	3-4
Examination	40%	1-4

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7502	Special Topic in Cyber Security

Level 7 **Credits 15**

Pre-requisites IT5504 Information Security I

IT5506 Introduction to Networking

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To enable learners to select a focus area of study in cyber security to reach their desired career and/or graduate studies goals. Topic selection will be based upon learner interest and faculty research and expertise and will generally change annually. Learners may substitute a cyber security related graduate diploma course for this requirement.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate, and analyse characteristics of, a specified current topic relating to cyber security.
2. Define, apply and implement an appropriate technological solution to a problem or problems related to the topic.

Indicative content

- Topic selection will be based upon learner interest and faculty research and expertise and will generally change annually.
- Detailed learning outcomes, content and assessment for the selected topic(s) will be developed prior to the commencement of the course and approved by the Head of School.
- In the event of course substitution, indicative content will be that of the substituted graduate diploma course.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Applied work	60%	1, 2
Examination	40%	1, 2

Successful completion of course:

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7503	Network Fundamentals for Information Assurance & Security

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To develop a student's knowledge of network protocol fundamentals and the analysis and correlation of data sourced from network packet streams and from various network devices in an enterprise network

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Capture, manipulate, and replay packets
2. Analyse data retrieved from network packet capture data using command line tools.
3. Develop and apply an advanced knowledge of key live and network forensic principles and methods.
4. Evaluate network forensics tools and evidence acquisition and analysis from various network devices.
5. Evaluate common approaches to network forensic analysis and their utility in various investigative scenarios
6. Apply knowledge of networking protocols to identify potential evidence within traffic captures and intrusion detection alerts.

Indicative content

- Network protocol fundamentals
- Packet capture, manipulation, replay
- Packet capture applications and data
- Network evidence types and sources
- Investigation OPSEC and footprint considerations
- Common network protocol analysis
- NSM data types
- Log data and other data to supplement network examinations

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessments	60%	1-6
Examination	40%	1-6

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7504	Security for DevOps

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To equip students with the knowledge of developing secure software using the DevOps process and cloud services

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the appropriate framework to examine possible architectures, automation, CI/CD and development toolset.
2. Develop software by implementing DevOps methodology and practices
3. Implement security in DevOps

Indicative content

- DevOps fundamentals, core-concepts, principles and practices
- DevOps Tools (Git, GitHub, Docker, Jenkins, etc.)
- Continuous Integration and Continuous Deployment in DevOps
- Testing Automation, Validation, Monitoring and Security

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	30%	1-2
Assessment	30%	1-3
Examination	40%	1-3

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7505	Incident Response & Digital Forensics

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To provide students with the essential skills to conduct an investigation of compromised systems during or after a cyber/security incident.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the use and application of incident response methodologies in dealing with system security-related incidents.
2. Acquire and analyse live response data from compromised systems.
3. Analyse memory for evidence of a compromise.
4. Analyse file system and operating system artefacts for evidence of a compromise.
5. Evaluate and apply tools and common processes in performing analysis of compromised systems.
6. Apply research methods to obtain current knowledge of events and tools/support kits in the subject area.

Indicative content

- Incident response methodologies
- File system analysis
- Operating system artefact analysis
- Acquisition and analysis of data from 'live' systems
- Memory analysis
- Common methods used by malicious actors to compromise systems

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1-6
Assessment	20%	2-3
Assessment	20%	4-5
Examination	40%	1-6

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7506	Cloud Security

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To enable students to understand the technologies and services that enable cloud computing, discuss different types of cloud computing models and investigate security and legal issues associated with cloud computing.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Compare and contrast the various cloud delivery and deployment models, particularly the security implications of each.
2. Analyse virtualisation technology and current attacks against it.
3. Critically evaluate service orchestration, business continuity, security, and service management functions for a cloud infrastructure.
4. Appraise the mechanisms used to secure cloud computing platforms, including trustworthy computing, secure computation, and data security in cloud environments.
5. Analyse the challenges that cloud computing introduces for regulatory compliance and digital forensics.

Indicative content

- Cybersecurity concepts, roles, threat model, problem escalation paths, legal environment and compliance requirements.
- Technical security techniques, tools (including tool validation), reporting, compliance to best practice (rules of engagement, penetration testing contracts and others).
- Practical security testing.
- Exposure to a wide range of tools, operating systems and attack techniques.
- Providing input to the security threat model and suggesting security policy solutions.
- Business security testing

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1, 2, 5
Assessment	20%	2-3
Assessment	20%	3-4
Examination	40%	1-5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

DS7501	Data Mining for Business Analytics

Level 7 **Credits 15**

Pre-requisites DS6502 Data Analysis and Visualisation

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To provide learners with practical experience in developing analytical tools that provide insight and understanding of business performance based on data mining methods.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Create a range of explanatory and predictive models that support fact-based management and decision making
2. Critically assess analytical results and convey their meaning to a target audience
3. Use statistical programming tools to perform a variety of commonly applied data mining functions on business data
4. Apply visualisation techniques for evaluating predictive models and the presentation of analytical results
5. Identify and explain appropriate data mining methods for tasks relating to business analytics
6. Critically assess the quality of predictive models using statistical methods

Indicative content

- Data mining algorithms and their application on business analytical problems including clustering, association rules, classification and machine learning
- Statistical methods for evaluating the predictive accuracy of data mining models
- Visual approaches for presenting and evaluating predictive models and their results
- Contemporary issues relating to data mining and its application within business analytics
- Communication strategies for conveying meaning from analytical results to a target audience
- Statistical programming tools and techniques for creating and evaluating predictive and explanatory models

Assessments

Assessment Method	Weighting	Learning Outcome/s
Course work	60%	1 - 6
Examination	40%	2, 5, 6

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

DS7502	Data Warehouse Design and Implementation

Level 7 **Credits 15**

Pre-requisites DS6503 Data Mining Tools and Techniques

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To provide learners with practical experience in the design and implementation of data warehouses and the development of Online Analytical Processing (OLAP) tools.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Identify and explain commonly used architectures in the design of data warehouses
2. Create multidimensional models using star and snowflake schemas
3. Perform Extract-Transform-Load (ETL) procedures to populate a data warehouse
4. Create queries that analyse multidimensional data from multiple perspectives
5. Identify and explain the characteristics of data warehouses and their role within strategies for achieving business intelligence
6. Perform data mining functions on data cubes and explain analytical results to a target audience

Indicative content

- ETL procedures involving staging, data integration and access layers
- Multidimensional modelling approaches for implementing data warehouse architectures
- Querying languages and reporting tools commonly used on OLAP cubes for roll-up, drill-down and slice and dice operations
- Approaches for conveying the analytical results from OLAP tools and data cube mining to a target audience
- Contemporary issues relating to data warehousing and its role within strategies for achieving business intelligence

Assessments

Assessment Method	Weighting	Learning Outcome/s
Course work	60%	2, 3, 4, 6
Examination	40%	1, 2, 5,

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IA7307	Cryptography & Security Mechanisms

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To enable students to develop an understanding of the design requirements and the application of secure systems in business, government and high security environments.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate and apply modern symmetric and asymmetric cryptographic techniques.
2. Explain and analyse the workings of fundamental public key and symmetric key cryptographic algorithms.
3. Analyse existing authentication and key agreement protocols, identify the weaknesses of these protocols.
4. Apply various security mechanisms derived from cryptography to network, web, and in a variety of system security scenarios.
5. Research, model and design/deploy real-world applications of cryptographic primitives and protocols within business context.

Indicative content

- Mathematical foundation for cryptography.
- Security attacks.
- Principles of modern cryptography: the history, block ciphers, message authentication codes, hash functions, public-key cryptography, digital signatures.
- Key management and distribution.
- Cryptanalysis.
- Zero knowledge proofs, secret sharing, and oblivious transfer and secure multi-party computation.
- Real-world applications of cryptographic primitives and protocols: network security practice, email security, IP security, web security, wireless network security, cloud security and system security.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1-2
Assessment	20%	2-3
Assessment	20%	3-4
Final Assessment	40%	1-5

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IA7308	Security Testing & Network Defence

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To develop the technical skills to conduct security tests against networks and the business skills necessary for providing justification, efficiency and an understanding of contemporary business and security needs.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the business needs of security testing and apply Cybersecurity knowledge and technical security baselines.
2. Undertake practical security testing and analyse and verify test results using industry processes.
3. Monitor the threat environment, using local and international security alert reports to provide timely and accurate advice to the security team and update the threat model.
4. Analyse the functionality and operation of security techniques and implement them as they apply to software, databases and data.

Indicative content

- Cybersecurity concepts, roles, threat model, problem escalation paths, legal environment and compliance requirements.
- Technical security techniques, tools (including tool validation), reporting, compliance to best practice (rules of engagement, penetration testing contracts and others).
- Practical security testing.
- Exposure to a wide range of tools, operating systems and attack techniques.
- Providing input to the security threat model and suggesting security policy solutions.
- Business security testing

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1-2
Assessment	20%	2-3
Assessment	20%	3-4
Final Assessment	40%	1-4

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IT7502	Digital Ethics

Level 7 **Credits 15**

Pre-requisites IT5502 Communications for IT

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To enable learners, through careful research and analysis, to identify and manage ethical issues related to the use and advancement of digital technologies.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Critically analyse ethical issues related to ICT
2. Critically evaluate, assess and apply ethical theories and ICT Codes of ethics to an ethical problem
3. Analyse a current ICT ethical problem using critical thinking techniques and provide solutions within the context of the analysis

Indicative content

- Critical thinking
- Professionalism
- Ethical theories
- Privacy
- Security
- Cybercrime
- Intellectual property
- Freedom of speech and regulation of the internet
- Legislation related to course content
- Big data
- Reliability
- Social and ethical issues related to emerging technologies
- Piracy

Assessment

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1
Assignment 2	30%	2
Examination	40%	3

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IT7508	Internship

Level 7 **Credits 30**

Pre-requisites: Completion of 240 credits at level 5 and above

Learning Hours Tutor-directed 10 hours
Self-directed 290 hours

Aims

To provide an opportunity for learners to gain industry experience relevant to a chosen area of IT and to reflect critically on concepts and perspectives studied.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Apply taught knowledge, research evidence and skills to a field of IT to assess work practices
2. Identify a problem relevant to the chosen organisation and recommend strategies for solving the problem
3. Document and present recommended strategies as appropriate to a selected audience

Indicative Content

Topics covered:

- 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

Assessments

Assessment Method	Weighting	Learning Outcome/s
Internship Logbook. Report on internship experience, including assessment of work practices in an IT Team in the chosen organisation, and referring to advanced concepts, theories and research relevant to the learner's area of IT.	30%	1
Final Report. Report on recommended strategies for solving a problem relevant to the chosen organisation, including relevant theories and practice	50%	2, 3
Presentation of recommended strategies to a selected audience	20%	2,3

Successful completion of the course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above overall assessments

The course outline will contain a list of recommended resources.

IT7510	IT Capstone Project

Level 7 **Credits 45**

Pre-requisites 240 credits at levels 5 and above with one level 7 paper

IT6502 Project Management

Learning Hours Tutor-directed 25 hours
Self-directed 425 hours

Aims

- To provide learners the opportunity to research, select, integrate and apply a range of techniques and technology to solve a business or industry based problem
- To provide learners the opportunity to demonstrate workplace-ready skills, attitudes and aptitudes suited to the IT industry

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Produce a proposal for the project
2. Work collaboratively, using professional and interpersonal skills, cooperative methods and communication with team members, project sponsor and advisor.
3. Apply the techniques and knowledge gained throughout the degree programme to research, analyse, design, develop, test and produce a solution
4. Manage and control all aspects of the project
5. Carry out a concluding review of the project with the sponsor
6. Produce relevant IT artefacts for the project. Range may include software, design, implementation, installation, testing, training, support, maintenance, administration, user manual and help documents
7. Critically reflect on learning that has taken place during the project and relevant courses during the degree
8. Effectively present the project experience and achievement to an audience including the project sponsor

Indicative content

Topics may include:

Developing a Business Proposal or Specification, Effective communication, Integration and application of knowledge, Project management, Project delivery, In industry-standard project documentation, Promotion of project outcome

Assessments

Assessment Method	Weighting	Learning Outcome/s
Project proposal	10%	1, 2, 6
Self-management review	10%	2, 4
Panel assessment	80%	2-8

Assessment Method	Weighting	Learning Outcome/s
Panel Assessment		
Development / deliverable	50%	3,5,6
Project management	5%	2,4
Self-evaluation and presentation	15%	2,3,7, 8
Client evaluation	10%	2,5

ID7502	Human Computer Interaction

Level 7 **Credits 15**

Pre-requisites IT5505 Interaction Design Fundamentals

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To enable learners to understand the principles of human-computer interaction (HCI) in relation to the design and implementation of computer systems and to experience different application tools in the design, implementation and documentation of user interfaces.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Analyse and critique interaction design products, methods utilising current theory and standards.
2. Appraise, select and implement appropriate data gathering techniques in order to interpret and analyse a user problem.
3. Apply user interface design processes and to analyse and develop requirements and scenarios.
4. Create a range of prototypes from low fidelity parallel prototypes to high fidelity functional prototypes utilising relevant technologies.
5. Plan user testing frameworks and guidelines.
6. Evaluate, interpret and present data to create a development plan.

Indicative content

- Human Computer Interaction theory, user interface architecture and technologies.
- Conceptual terms for analysing human interaction with products (e.g., affordance and feedback).
- Ethical and practical constraints in relation to HCI fieldwork
- HCI frameworks, models and life cycles including need finding and data gathering techniques
- User interface design processes, in response to triangulated data collections and requirements:
  - conceptual modelling
  - development of interface metaphors
  - affordances
  - scenarios and experience mapping
- User centred design research, prototyping techniques and technologies
- User testing frameworks and guidelines
- Creating a development plan
- Applying findings to an interaction design life cycle utilising relevant technologies.
- Ubiquitous computing
- Virtual reality and Augmented reality

Assessments

Assessment Method	Weighting	Learning Outcome/s
Research Essay	25%	1, 2
Project 1	35 %	2,3,4,5,6
Project 2	40 %	2,3,4,5,6

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

SD7501	Web Application Development

Level 7 **Credits 15**

Pre-requisites IT5507 Fundamentals of Data Science

SD6502 Programming II

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aims

To enable the learner to:

- Evaluate and apply the use of appropriate platform and architecture, for the development of web applications.
- Integrate applications with a database and learn how to access web data using managed data providers and objects.
- Investigate the security challenges and security models for web applications.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the business, technical and social implications of web application development.
2. Analyse the background and underlying principles of web application development in the selected framework.
3. Design and implement an appropriate secure internet application solution to an unstructured problem.
4. Research and critically evaluate new tools and technologies in relation to internet application development.

Indicative Content

The course will contain the following topics:

ASP.NET framework, development tools and environment , MVC framework, MVC routing, tracing & debugging, AJAX & JQuery, Data access and Data Binding , ASP.NET Core with Entity Framework , ASP.NET Core Identity, RESTful Web Services and Web API's, Web Application Security, Windows Presentation Foundation (WPF), Frontend Development platforms for Web Application , Web Application Deployment

Assessment

Assessment Method	Weight %	Learning Outcomes
Research Report and Presentation	25%	1, 2, 4
Programming Project	35%	3, 4
Final Exam	40%	1, 2, 3, 4

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

SD7502	Intelligent Systems Development

Level 7 **Credits 15**

Pre-requisites IT5501 Mathematics for IT

SD6502 Programming II

Learning Hours

Tutor Directed	52 hours
Self-directed	98 hours

Aim

To provide learners with an advanced level of knowledge and skills required for developing artificially intelligent applications.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Prepare framework in a suitable programming environment.
2. Apply the software tools required for a complex application.
3. Implement the recent advances in software development.
4. Analyse data using a pattern recognition approach to identify features of interest.
5. Research, design, develop, and reconstruct models by using current APIs for building a machine learning based application for a complex problem.

Indicative content

- Introduction to computer vision, and Open Source Computer Vision (OpenCV) library
- Use and improve open source W&W Vision library
- Types of features and their application
- Image segmentation
- Deep Learning and GPU processing
- Google Tensor flow vs. Microsoft Cognitive Toolkit
- Keras
- Identify and apply filters for noise estimation and data prediction

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment	40%	1, 3
Midterm project	20%	1, 4
Final Project	40%	1 - 5

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

Appendix E: Graduate Certificate in Cybersecurity (Level 7)

CS7501	Information Security III

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

This course covers the key technologies and systems required to implement defence in depth and protect organisational information infrastructures from threats and attacks.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe and implement systems and methods employed to provide operating system and host-based security for a range of potential threats
2. Categorise the technologies and techniques necessary for the defence and maintenance of networks and their hosts and demonstrate their use
3. Explain the functionality and operation of security techniques and implement them as they apply to software, databases and data
4. Evaluate the security models, deployment and management of the security of information systems and methods available to identify and reduce risk

Indicative content

- Host-based and operating system security
- Application and data security
- Database security
- Network security
- Security architecture and models
- Risk mitigation techniques

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1-2
Assignment 2	30%	3-4
Examination	40%	1-4

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7503	Network Fundamentals for Information Assurance & Security

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To develop a student's knowledge of network protocol fundamentals and the analysis and correlation of data sourced from network packet streams and from various network devices in an enterprise network

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Capture, manipulate, and replay packets
2. Analyse data retrieved from network packet capture data using command line tools.
3. Develop and apply an advanced knowledge of key live and network forensic principles and methods.
4. Evaluate network forensics tools and evidence acquisition and analysis from various network devices.
5. Evaluate common approaches to network forensic analysis and their utility in various investigative scenarios
6. Apply knowledge of networking protocols to identify potential evidence within traffic captures and intrusion detection alerts.

Indicative content

- Network protocol fundamentals
- Packet capture, manipulation, replay
- Packet capture applications and data
- Network evidence types and sources
- Investigation OPSEC and footprint considerations
- Common network protocol analysis
- NSM data types
- Log data and other data to supplement network examinations

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessments	60%	1-6
Examination	40%	1-6

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7504	Security for DevOps

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To equip students with the knowledge of developing secure software using the DevOps process and cloud services

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the appropriate framework to examine possible architectures, automation, CI/CD and development toolset.
2. Develop software by implementing DevOps methodology and practices
3. Implement security in DevOps

Indicative content

- DevOps fundamentals, core-concepts, principles and practices
- DevOps Tools (Git, GitHub, Docker, Jenkins, etc.)
- Continuous Integration and Continuous Deployment in DevOps
- Testing Automation, Validation, Monitoring and Security

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	30%	1-2
Assessment	30%	1-3
Examination	40%	1-3

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7505	Incident Response & Digital Forensics

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To provide students with the essential skills to conduct an investigation of compromised systems during or after a cyber/security incident.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the use and application of incident response methodologies in dealing with system security-related incidents.
2. Acquire and analyse live response data from compromised systems.
3. Analyse memory for evidence of a compromise.
4. Analyse file system and operating system artefacts for evidence of a compromise.
5. Evaluate and apply tools and common processes in performing analysis of compromised systems.
6. Apply research methods to obtain current knowledge of events and tools/support kits in the subject area.

Indicative content

- Incident response methodologies
- File system analysis
- Operating system artefact analysis
- Acquisition and analysis of data from 'live' systems
- Memory analysis
- Common methods used by malicious actors to compromise systems

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1-6
Assessment	20%	2-3
Assessment	20%	4-5
Examination	40%	1-6

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IA7307	Cryptography & Security Mechanisms

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To enable students to develop an understanding of the design requirements and the application of secure systems in business, government and high security environments.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate and apply modern symmetric and asymmetric cryptographic techniques.
2. Explain and analyse the workings of fundamental public key and symmetric key cryptographic algorithms.
3. Analyse existing authentication and key agreement protocols, identify the weaknesses of these protocols.
4. Apply various security mechanisms derived from cryptography to network, web, and in a variety of system security scenarios.
5. Research, model and design/deploy real-world applications of cryptographic primitives and protocols within business context.

Indicative content

- Mathematical foundation for cryptography.
- Security attacks.
- Principles of modern cryptography: the history, block ciphers, message authentication codes, hash functions, public-key cryptography, digital signatures.
- Key management and distribution.
- Cryptanalysis.
- Zero knowledge proofs, secret sharing, and oblivious transfer and secure multi-party computation.
- Real-world applications of cryptographic primitives and protocols: network security practice, email security, IP security, web security, wireless network security, cloud security and system security.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1-2
Assessment	20%	2-3
Assessment	20%	3-4
Final Assessment	40%	1-5

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IA7308	Security Testing & Network Defence

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To develop the technical skills to conduct security tests against networks and the business skills necessary for providing justification, efficiency and an understanding of contemporary business and security needs.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the business needs of security testing and apply Cybersecurity knowledge and technical security baselines.
2. Undertake practical security testing and analyse and verify test results using industry processes.
3. Monitor the threat environment, using local and international security alert reports to provide timely and accurate advice to the security team and update the threat model.
4. Analyse the functionality and operation of security techniques and implement them as they apply to software, databases and data.

Indicative content

- Cybersecurity concepts, roles, threat model, problem escalation paths, legal environment and compliance requirements.
- Technical security techniques, tools (including tool validation), reporting, compliance to best practice (rules of engagement, penetration testing contracts and others).
- Practical security testing.
- Exposure to a wide range of tools, operating systems and attack techniques.
- Providing input to the security threat model and suggesting security policy solutions.
- Business security testing

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1-2
Assessment	20%	2-3
Assessment	20%	3-4
Final Assessment	40%	1-4

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7506	Cloud Security

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To enable students to understand the technologies and services that enable cloud computing, discuss different types of cloud computing models and investigate security and legal issues associated with cloud computing.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Compare and contrast the various cloud delivery and deployment models, particularly the security implications of each.
2. Analyse virtualisation technology and current attacks against it.
3. Critically evaluate service orchestration, business continuity, security, and service management functions for a cloud infrastructure.
4. Appraise the mechanisms used to secure cloud computing platforms, including trustworthy computing, secure computation, and data security in cloud environments.
5. Analyse the challenges that cloud computing introduces for regulatory compliance and digital forensics.

Indicative content

- Cybersecurity concepts, roles, threat model, problem escalation paths, legal environment and compliance requirements.
- Technical security techniques, tools (including tool validation), reporting, compliance to best practice (rules of engagement, penetration testing contracts and others).
- Practical security testing.
- Exposure to a wide range of tools, operating systems and attack techniques.
- Providing input to the security threat model and suggesting security policy solutions.
- Business security testing

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1, 2, 5
Assessment	20%	2-3
Assessment	20%	3-4
Examination	40%	1-5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IT7502	Digital Ethics

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To enable learners, through careful research and analysis, to identify and manage ethical issues related to the use and advancement of digital technologies.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Critically analyse ethical issues related to ICT
2. Critically evaluate, assess and apply ethical theories and ICT Codes of ethics to an ethical problem
3. Analyse a current ICT ethical problem using critical thinking techniques and provide solutions within the context of the analysis

Indicative content

- Critical thinking
- Professionalism
- Ethical theories
- Privacy
- Security
- Cybercrime
- Intellectual property
- Freedom of speech and regulation of the internet
- Legislation related to course content
- Big data
- Reliability
- Social and ethical issues related to emerging technologies
- Piracy

Assessment

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1
Assignment 2	30%	2
Examination	40%	3

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

Appendix F: Graduate Diploma in Cybersecurity (Level 7)

CS7501	Information Security III

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

This course covers the key technologies and systems required to implement defence in depth and protect organisational information infrastructures from threats and attacks.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe and implement systems and methods employed to provide operating system and host-based security for a range of potential threats
2. Categorise the technologies and techniques necessary for the defence and maintenance of networks and their hosts and demonstrate their use
3. Explain the functionality and operation of security techniques and implement them as they apply to software, databases and data
4. Evaluate the security models, deployment and management of the security of information systems and methods available to identify and reduce risk

Indicative content

- Host-based and operating system security
- Application and data security
- Database security
- Network security
- Security architecture and models
- Risk mitigation techniques

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1-2
Assignment 2	30%	3-4
Examination	40%	1-4

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7503	Network Fundamentals for Information Assurance & Security

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To develop a student's knowledge of network protocol fundamentals and the analysis and correlation of data sourced from network packet streams and from various network devices in an enterprise network

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Capture, manipulate, and replay packets
2. Analyse data retrieved from network packet capture data using command line tools.
3. Develop and apply an advanced knowledge of key live and network forensic principles and methods.
4. Evaluate network forensics tools and evidence acquisition and analysis from various network devices.
5. Evaluate common approaches to network forensic analysis and their utility in various investigative scenarios
6. Apply knowledge of networking protocols to identify potential evidence within traffic captures and intrusion detection alerts.

Indicative content

- Network protocol fundamentals
- Packet capture, manipulation, replay
- Packet capture applications and data
- Network evidence types and sources
- Investigation OPSEC and footprint considerations
- Common network protocol analysis
- NSM data types
- Log data and other data to supplement network examinations

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessments	60%	1-6
Examination	40%	1-6

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7504	Security for DevOps

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To equip students with the knowledge of developing secure software using the DevOps process and cloud services

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the appropriate framework to examine possible architectures, automation, CI/CD and development toolset.
2. Develop software by implementing DevOps methodology and practices
3. Implement security in DevOps

Indicative content

- DevOps fundamentals, core-concepts, principles and practices
- DevOps Tools (Git, GitHub, Docker, Jenkins, etc.)
- Continuous Integration and Continuous Deployment in DevOps
- Testing Automation, Validation, Monitoring and Security

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	30%	1-2
Assessment	30%	1-3
Examination	40%	1-3

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7505	Incident Response and Digital Forensics

Level 7 **Credits 15**

Pre-requisites None

Learning Hours

Tutor Directed	52 hours
Self-directed	98 hours

Aim

To provide students with the essential skills to conduct an investigation of compromised systems during or after a cyber/security incident.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the use and application of incident response methodologies in dealing with system security-related incidents.
2. Acquire and analyse live response data from compromised systems.
3. Analyse memory for evidence of a compromise.
4. Analyse file system and operating system artefacts for evidence of a compromise.
5. Evaluate and apply tools and common processes in performing analysis of compromised systems.
6. Apply research methods to obtain current knowledge of events and tools/support kits in the subject area.

Indicative content

- Incident response methodologies
- File system analysis
- Operating system artefact analysis
- Acquisition and analysis of data from 'live' systems
- Memory analysis
- Common methods used by malicious actors to compromise systems

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1-6
Assessment	20%	2-3
Assessment	20%	4-5
Examination	40%	1-6

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IA7307	Cryptography and Security Mechanisms

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To enable students to develop an understanding of the design requirements and the application of secure systems in business, government and high security environments.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate and apply modern symmetric and asymmetric cryptographic techniques.
2. Explain and analyse the workings of fundamental public key and symmetric key cryptographic algorithms.
3. Analyse existing authentication and key agreement protocols, identify the weaknesses of these protocols.
4. Apply various security mechanisms derived from cryptography to network, web, and in a variety of system security scenarios.
5. Research, model and design/deploy real-world applications of cryptographic primitives and protocols within business context.

Indicative content

- Mathematical foundation for cryptography.
- Security attacks.
- Principles of modern cryptography: the history, block ciphers, message authentication codes, hash functions, public-key cryptography, digital signatures.
- Key management and distribution.
- Cryptanalysis.
- Zero knowledge proofs, secret sharing, and oblivious transfer and secure multi-party computation.
- Real-world applications of cryptographic primitives and protocols: network security practice, email security, IP security, web security, wireless network security, cloud security and system security.

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1-2
Assessment	20%	2-3
Assessment	20%	3-4
Final Assessment	40%	1-5

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IA7308	Security Testing and Network Defence

Level 7 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

To develop the technical skills to conduct security tests against networks and the business skills necessary for providing justification, efficiency and an understanding of contemporary business and security needs.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Evaluate the business needs of security testing and apply Cybersecurity knowledge and technical security baselines.
2. Undertake practical security testing and analyse and verify test results using industry processes.
3. Monitor the threat environment, using local and international security alert reports to provide timely and accurate advice to the security team and update the threat model.
4. Analyse the functionality and operation of security techniques and implement them as they apply to software, databases and data.

Indicative content

- Cybersecurity concepts, roles, threat model, problem escalation paths, legal environment and compliance requirements.
- Technical security techniques, tools (including tool validation), reporting, compliance to best practice (rules of engagement, penetration testing contracts and others).
- Practical security testing.
- Exposure to a wide range of tools, operating systems and attack techniques.
- Providing input to the security threat model and suggesting security policy solutions.
- Business security testing

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1-2
Assessment	20%	2-3
Assessment	20%	3-4
Final Assessment	40%	1-4

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS7506	Cloud Security

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To enable students to understand the technologies and services that enable cloud computing, discuss different types of cloud computing models and investigate security and legal issues associated with cloud computing.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Compare and contrast the various cloud delivery and deployment models, particularly the security implications of each.
2. Analyse virtualisation technology and current attacks against it.
3. Critically evaluate service orchestration, business continuity, security, and service management functions for a cloud infrastructure.
4. Appraise the mechanisms used to secure cloud computing platforms, including trustworthy computing, secure computation, and data security in cloud environments.
5. Analyse the challenges that cloud computing introduces for regulatory compliance and digital forensics.

Indicative content

- Cybersecurity concepts, roles, threat model, problem escalation paths, legal environment and compliance requirements.
- Technical security techniques, tools (including tool validation), reporting, compliance to best practice (rules of engagement, penetration testing contracts and others).
- Practical security testing.
- Exposure to a wide range of tools, operating systems and attack techniques.
- Providing input to the security threat model and suggesting security policy solutions.
- Business security testing

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assessment	20%	1, 2, 5
Assessment	20%	2-3
Assessment	20%	3-4
Examination	40%	1-5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

IT7502	Digital Ethics

Level 7 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To enable learners, through careful research and analysis, to identify and manage ethical issues related to the use and advancement of digital technologies.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Critically analyse ethical issues related to ICT
2. Critically evaluate, assess and apply ethical theories and ICT Codes of ethics to an ethical problem
3. Analyse a current ICT ethical problem using critical thinking techniques and provide solutions within the context of the analysis

Indicative content

- Critical thinking
- Professionalism
- Ethical theories
- Privacy
- Security
- Cybercrime
- Intellectual property
- Freedom of speech and regulation of the internet
- Legislation related to course content
- Big data
- Reliability
- Social and ethical issues related to emerging technologies
- Piracy

Assessment

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1
Assignment 2	30%	2
Examination	40%	3

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS6501	Information Security II

Level 6 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To enable learners to develop an understanding of the foundations of cyber security, threats towards information system, and perform risk assessment and management.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe information security principles, key terms and essential concepts and examine the business drivers behind the design process of information security analysis
2. Identify and explain common attack techniques and sources of threat
3. Conduct a fundamental information security assessment for an organisation, including risk identification and assessment, implementing effective control measures to minimise the risk introduced by potential threats, and performing cost benefit analysis
4. Describe and apply physical, procedural and technical controls to protect information system components
5. Describe and explain legal, regulatory, and ethical standards relevant to an information systems

Indicative content

- Confidentiality, integrity and availability
- Identification, authentication, authorisation and access control
- Auditing and accountability
- Attacks, threats and vulnerabilities
- Operating system and application security
- Physical, personnel and operations security
- Network security controls
- Security standards and policies
- Risk assessment and management
- Legal, ethical and professional issues in information security

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1-3
Assignment 2	30%	3-5
Examination	40%	1-5

Successful completion of course:

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS6504	Cryptography and Blockchain Fundamentals

Level 6 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 52 hours
Self-directed 98 hours

Aim

This course exposes learners to blockchain technology, smart contracts, fundamentals of cryptocurrency and applications. Learners will also learn the fundamentals of cryptography.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Explain blockchains and the cryptocurrency ecosystem
2. Analyse the role cryptography plays in a blockchain
3. Develop simple blockchains and distributed applications
4. Examine security issues within the cryptocurrency ecosystem

Indicative content

- Basic Cryptography: public/private key encryption, hash functions, digital signatures, Merkle trees
- Blockchain:
  - Properties: immutability, consensus, anonymity
  - Components: node, distributed ledger, transaction
  - Operations: verification, proof of work
- Smart contracts and blockchain applications
- Privacy and scalability issues in blockchain
- Block ciphers
- Digital signatures

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1: written	20%	1-2
Assignment 2: Labs	20%	1-2
Group Project	20%	3
Examination	40%	1-4

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS6503	Digital Forensics

Level 6 **Credits 15**

Pre-requisites None

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To provide learners with a comprehensive understanding of digital forensic principles and the collection, preservation, and analysis of digital evidence.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Identify the attributes of file systems and storage media and perform analysis on at least two common file systems
2. Identify and analyse potential sources of electronic evidence
3. Describe the importance of maintaining the integrity of digital evidence
4. Perform basic forensic data acquisition and analysis using computer and network-based applications and utilities
5. Accurately document forensic procedures and results and develop a case summary

Indicative content

- Forensic investigation
- Operating system functionality
- File system analysis
- Operating system artifact analysis
- Browser and email analysis
- Investigative methodologies
- Forensic report writing
- Overview of memory forensics

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1, 2, 4
Assignment 2	30%	2, 3, 5
Examination	40%	1-5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

CS6502	Linux System Administration

Level 6 **Credits 15**

Pre-requisites Nil

Learning Hours	Tutor Directed	52 hours
	Self-directed	98 hours

Aim

To provide a practical introduction to junior and intermediate level Linux/Unix system administration and to enable the learner to develop the skills required to manage small-sized Linux networks.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Explain the fundamental elements of the Linux/Unix systems
2. Install, configure and manage a workstation including partitioning, managing software and devices, Linux desktop and shell environments through the command line
3. Explain and perform administrative and troubleshooting tasks including, but not limited to, management of users, groups, printing services, managing Linux processes, file and folder permissions, log management, backup and basic security tasks through command line
4. Demonstrate an understanding of Linux networking services, setup basic Local Area Network (LAN) and Internet connectivity and perform network troubleshooting
5. Install, configure and manage a range of systems present in a typical Linux network environment

Indicative content

- Kernel, boot, initialisation, shutdown and run levels
- Printing, documentation and shell environments
- Linux installation, GNU and Unix commands, managing hardware and devices
- The X Window System, Linux file systems, Linux user and group management, file and folder permissions, Linux processes and task scheduling
- Package management, compiling software from source, shell scripting and basic shell programming
- Administrative tasks including management of networking services, backup and security
- Basic network configuration, setup and configuration of network services such as web server, file server, Dynamic Host Configuration Protocol (DHCP) and email servers

Assessments

Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1-3
Assignment 2	30%	2-5
Examination	40%	1-5

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

NI6503	Unified Infrastructure Services

Level 6 **Credits 15**

Pre-requisites IT5506 Introduction to Networking

Learning Hours Tutor Directed 52 hours

Self-directed 98 hours

Aim

To introduce the fundamental network infrastructure components necessary to implement a small to medium sized network.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Demonstrate a comprehensive knowledge of the technologies and techniques necessary to configure Directory Services, Group Policy and account management
2. Analyse and implement and maintain appropriate unified infrastructure services

Indicative content

- Server operating system
- Directory services
- User account administration
- Administration via group policies
- DNS configuration and deployment scenarios
- DHCP including deployment and backup
- Managing DNS and DHCP

Assessments

Assessment Method	Weighting	Learning Outcome/s
Test 1	25%	1, 2
Test 1	25%	1, 2
Practical 1	25%	1, 2
Practical 2	25%	1, 2

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

IT5506	Introduction to Networking

Level 5 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 65 hours
Self-directed 85 hours

Aim

To introduce fundamental networking concepts, technologies, the basics of network theory and the skills needed to implement a simple network.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Describe network protocol models and devices to explain the layers of communications in data networks.
2. Design and calculate IP addresses and subnet masks for both IPv4 and IPv6 for given simple networks, using IPv4 and IPv6.
3. Explain fundamental Ethernet concepts.
4. Describe and build a simple Ethernet network using routers and switches employing basic cabling and network design.
5. Identify and perform basic router and switch configuration and verification.

Indicative content

- Network Protocols
- IP address calculations
- Ethernet concepts
- Subnetting
- Basic Router and Switch Configuration
- Network Topologies
- Networking concepts: client/server, Peer-to-peer

Assessment

Assessment Method	Weighting	Learning Outcomes
Test 1	20%	1, 2, 3
Test 2	30%	4, 5
Practical 1	20%	1, 2, 3
Practical 2	30%	4, 5

Successful completion of course

To pass a course where there is no final examination, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments

IT5504	Information Security I

Level 5 **Credits 15**

Pre-requisites None

Learning Hours Tutor Directed 65 hours
Self-directed 85 hours

Aim

To provide learners with an understanding of basic information security principles and approaches as well as to recognise the major information security threats and countermeasures.

Learning Outcomes

On successful completion of this course, the learner will be able to:

1. Explain information security fundamentals
2. Analyse personal security
3. Identify threats to computer security
4. Identify and apply internet security procedures
5. Examine mobile security
6. Identify risks to Internet privacy

Indicative content

- Information security fundamentals
- Personal security
- Computer security
- Malware
- Mobile security
- Privacy

Assessments

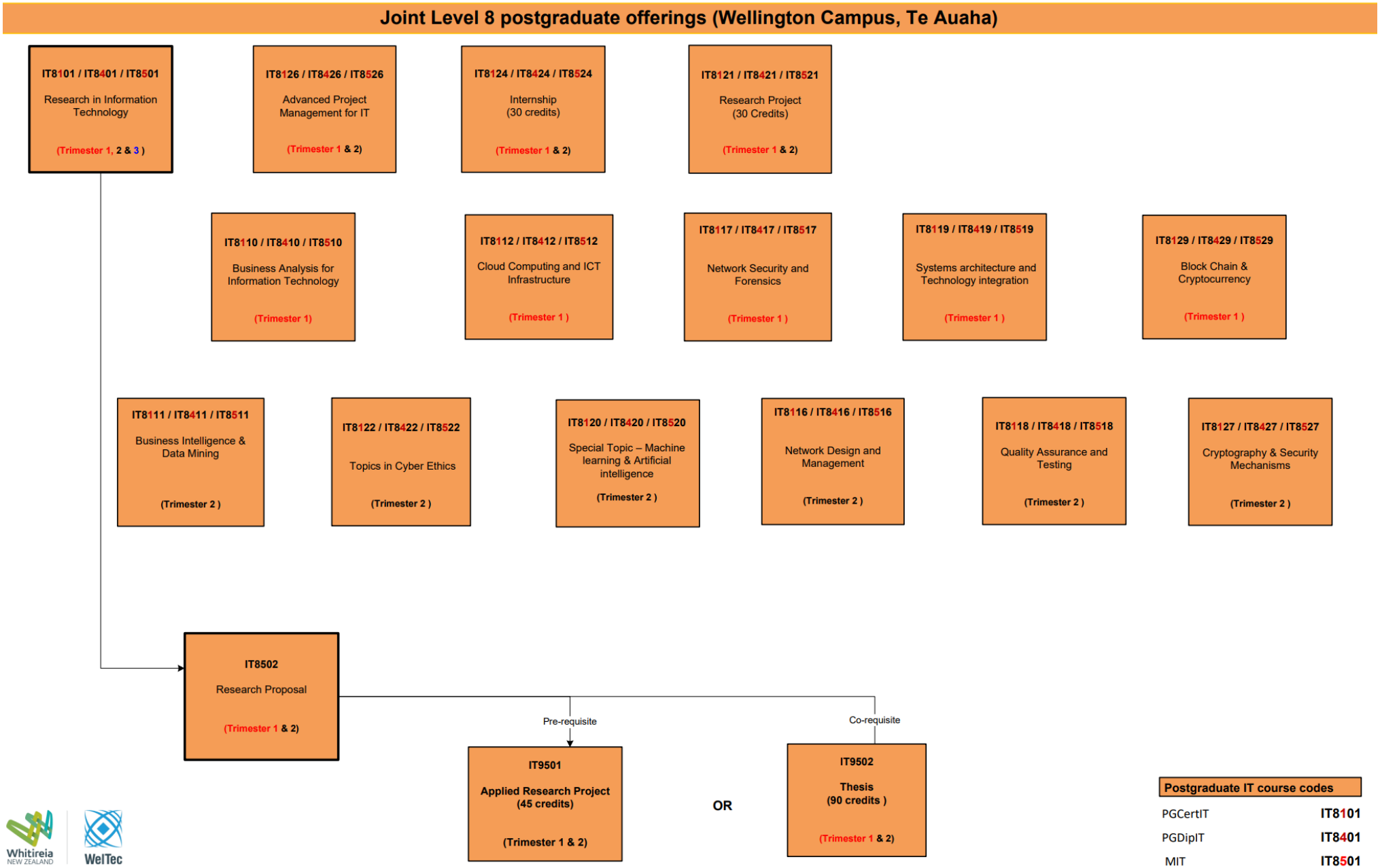
Assessment Method	Weighting	Learning Outcome/s
Assignment 1	30%	1 - 3
Assignment 2	30%	4 - 6
Examination	40%	1 - 6

Successful completion of course

To pass a course where there is an examination set, a learner must:

- Attempt all assessments
- Achieve an average mark of **50%** or above over all assessments, including the examination
- Achieve a mark of **40%** or above in their final examination

2023 Postgraduate offering and courses



Appendix G: Postgraduate Certificate, Diploma, and the Master in IT

IT8x26	Advanced Project Management for Information Technology

Level 8 **Credits 15**

Learning hours Tutor-directed 85
Self-directed 65

Status Elective

Aim

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

Learning Outcomes:

Upon successful completion 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 methodologies and processes, which may include PRINCE2 and Agile approaches e.g. – SCRUM, and KANBAN and DevOps.
- Project management techniques, which may include critical path analysis, Gantt chart, PERT, critical chain, feasibility analysis.
- Project Management tools.

Assessments

Assessment Type	Weighting	Learning Outcome/s
Evaluation report	30%	1,2
Project plan and presentation	40%	2,3
Project implementation report and reflection	30%	1,3

Successful completion of course
To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT8x01	Research in Information Technology

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

Status Compulsory

Aim

To provide students with a framework for applied research in Information Technology through examining research methods and publications, with particular 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).

Assessment Type

Assessment Type	Weighting	Learning Outcome/s
Assignment	40%	1,2
Assignment	30%	2,3,4
Assignment	30%	1,2,3,4

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT8x10	Business Analysis in Information Technology

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

Aim

To enable students to manage all aspects of business process development.

Learning Outcomes

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

1. Review literature on success and failure of IT-related business analysis projects, business process management and case management.
2. Elicit requirements of a business process and rank requirements on business value, priority and effort.
3. Design a requirements repository using templates and present requirements using diagrams such as entity-state diagrams.
4. Develop and validate an object-orientated or relational database to describe the persistent data.

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.

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment	30%	1,2
Assignment (report and presentation)	50%	2,3,4
Assignment	20%	1,2,3,4

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually

IT8x11	Business Intelligence and Data Mining

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

Aim

To provide students with a framework for identifying and aligning computer-based data analysis

strategies with organisational goals in order 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

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment	30%	1,2
Assignment	40%	2,3,
Assignment (report and presentation)	30%	1,3

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT8x12	Cloud Computing and ICT Infrastructure

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

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. Investigate the concepts of effective communication and emotional intelligence in a range of leadership and managerial scenarios
2. Demonstrate advanced oral and written communication skills and the ability to communicate effectively to a specified audience in a leadership or managerial setting
4. Demonstrate analytical and critical thinking skills in a range of settings
5. Demonstrate effective team facilitation techniques by incorporating aspects of dealing with different ethnicities and cross-cultural communication.

Indicative Content

Benefits and challenges of cloud computing, advances in ICT infrastructure

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment	30%	1,2
Assignment (report)	30%	2,3,4
Assignment (report and presentation)	40%	1,3,4

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually

IT8x15	Multimedia Application Development for Mobile Devices

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

Aim

To provide students with a framework for the development of multimedia applications for mobile devices.

Learning Outcomes

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

1. Critically assess the efficacy of multimedia applications on mobile devices and their business, technical and social implications.
2. Evaluate the different mobile operating systems for the suitability of multimedia applications.
3. Develop tools to analyse multimedia applications from an HCI perspective.
4. Design and build multimedia applications

Indicative Content

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

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment	20%	1,2
Assignment	30%	1,2,3,4
Assignment	50%	3,4

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT8x16	Network Design and Management

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

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 management protocols, network monitoring and monitoring tools.
2. Evaluate the concepts and processes of network requirements analysis and flow analysis.
3. Critically assess network management systems and tools, performance architecture and analysis.

Indicative Content

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

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment	50%	1,2
Assignment	50%	1,2,3

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT8x17	Network Security and Forensics

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

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 countermeasures and their effectiveness.
3. Critically assess forensic investigation techniques and tools for investigating breaches of security.

Indicative Content

Security threats (including denial of service, distributed denial of service, SQL injection, and social engineering attacks), security countermeasures to prevent or mitigate those threats (including firewalls, virtual private networks, and honeypots), digital forensic investigation techniques (including acquisition, preservation, analysis and presentation).

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment	30%	1,2
Assignment	35%	2,3
Assignment	35%	1,3

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually

IT8x18	Quality Assurance and Testing

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

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.

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment	30%	1,2
Assignment	30%	2,3
Assignment	40%	1,3

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT8x19	Systems Architecture and Technology Integration

Level 8 **Credits 15**
Learning hours 45 directed
105 Self-directed

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 computing.

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

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment	60%	1,2,3
Assignment	40%	1,2,3

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually

IT8x20	Special Topic in Information Technology

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

Aim

To enable students to understand the underlying principles of a specific topic relating to information and communications technology, apply the underlying principles and concepts to the identification and solution of unstructured problems in unfamiliar settings, research the topic and evaluate and implement novel methods of solving problems related to the topic.

Learning Outcomes

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

1. Critically analyse the background and underlying principles of the major concepts of the topic.
2. Research and critically evaluate aspects of the topic.
3. Critically assess the business, technical and social implications of the topic.
4. Design and implement an appropriate technological solution to an unstructured problem or problems related to the topic.

Indicative Content

Background, underlying principles, major concepts, business, technical and social implications, technological solution.

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment	20%	1,2
Assignment	60%	2,3,4
Assignment	20%	1,3,4

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually

IT8x22	Topics in Cyber Ethics

Level 8 **Credits 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 ICT.
2. Research established ICT Codes of Ethics and critically evaluate the guidance they provide in managing an identified ethical problem.
3. Analyse a current ICT ethical dilemma using critical thinking techniques and provide possible solutions within the context of the analysis

Indicative Content

- Introduction to cyberethics,
- The Doing Ethics Technique (DET), ethical concepts and theories,
- Professional ethics and moral responsibility,
- Privacy,
- Surveillance and cyberspace',
- Critical thinking and rational argument, intellectual property,
- Security and cyberspace, cybercrime,
- The Digital Divide,
- Emerging and converging technologies,
- Regulating commerce and speech in cyberspace.

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment (Research Report)	30%	1,2
Assignment (Report and presentation)	30%	2,3
Assignment	40%	1,3

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

IT8x24	Internship

Level 8 **Credits 30**

Learning hours 95 directed
205 Self-directed

Status Elective Not available to offshore students

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

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment (Internship Logbook)	20%	1,2
Assignment (Final Report)	30%	2,3
Assignment (Presentation)	50%	1,3

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually

IT8x26	Cryptography and Security Mechanisms

Level 8 **Credits 30**

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.

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment 1 (report)	30%	1,2
Assignment (report)	30%	2,3
Project (report and presentation)	40%	1,3

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT8x28	Blockchain and Cryptocurrency

Level 8 **Credits 15**

Learning hours 45 directed
105 Self-directed

Status Elective

Aim

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

Learning Outcomes

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

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

Assessment Type Weighting Learning Outcomes

Assessment Type	Weighting	Learning Outcome/s
Assignment 1: Presentation outlining the project	20%	1,2
Assignment 2: Research/Project Report	60%	2,3
Project 3: Poster describing completed project	20%	1,3

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT8502	Research Proposal

Level 8 **Credits 15**

Pre-requisites IT8400 Research in Information Technology

Learning Hours 45 directed,
105 self-directed

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.

Assessment Type	Weighting	Learning Outcomes
Assignment	30%	1, 2
Assignment (presentation)	20%	2, 3, 4
Assignment (proposal)	50%	1, 3,4

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT9501	Applied Research Project

Level 9 **Credits 45**

Pre-requisites IT8400 Research in Information Technology
IT8417 Research Proposal

Learning Hours 50 directed,
400 self-directed

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 in order 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

Assessment Type	Weighting	Learning Outcomes
Report	100%	all

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.

IT9502	Thesis

Level 9 **Credits 90**

Pre-requisites IT8400 Research in Information Technology
IT8417 Research Proposal

Learning Hours 50 directed,
850 self-directed

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 a suitable research question(s).
2. Justify data collection and analysis methods chosen for answering research question(s).
3. Collect and critically analyse data and draw valid conclusions.
4. Demonstrate independent thought in interpreting and discussing research findings.
5. 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

Assessment Type	Weighting	Learning Outcomes
Completed thesis	100%	all

Successful completion of course

To pass each course, students attempt all assessments and achieve a minimum of 50% overall.

Recommended Resources

A reading list will be supplied to students at the beginning of the course and updated annually.